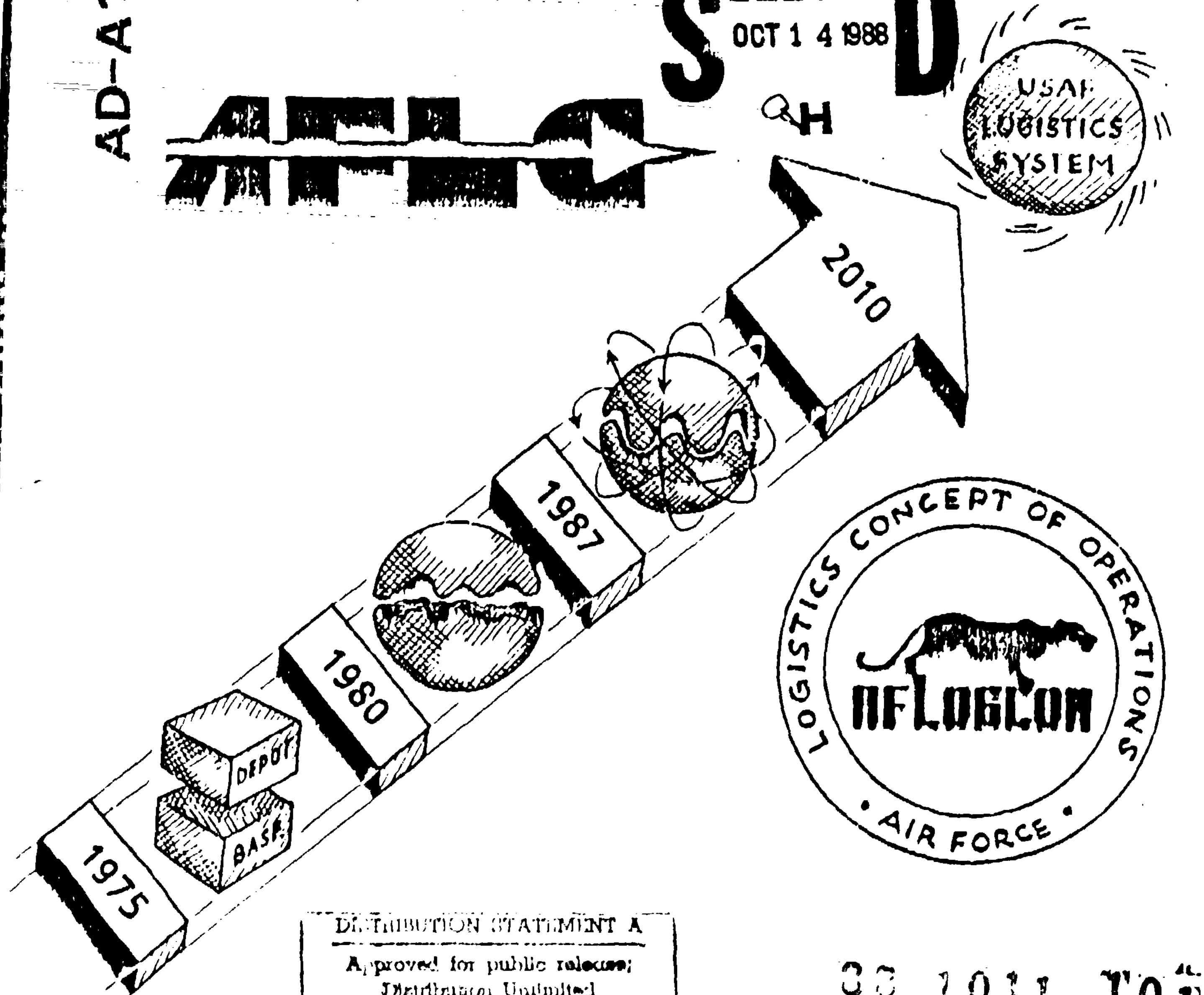
BUILDING COMBAT STRENGTH THROUGH LOGISTICS: TRANSLATING THE NEW AIR FORCE LOGISTICS CONCEPT OF OPERATIONS INTO ACTION



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A decade of research involving the unpredictability of peace and wartime demands in the field challenges many of the fundamental principles upon which the Air Force logistics system is based. New decision-tools for dealing with these uncertainties are undergoing prototype testing, development, and implementation. This paper provides background on a new logistics concept of operations for ensuring that the Air Force can fully utilize available resources to optimize aircraft availability under peacetime and wartime conditions. An AFLC perspective is offered on the basic limitations to flexible and responsive logistics support in a high threat conventional conflict and the kind of actions that are required to make the Air Force logistics system of the future more capable of supporting the full spectrum of war

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19. (cont.) scenarios. Today's logistics processes assume wartime requirements can be predicted accurately enough to identify the resources combat units need to be self-sufficient during the initial period of war. Yet peacetime operations and combat simulation demonstrate that this approach is totally inadequate in war. Air bases in theaters of war are no longer safe havens from enemy action; combat damage to runways, maintenance facilities, prepositioned supplies, and other logistics resources will be extremely high. Continuity of operations under these conditions requires much greater integration across air bases and between the traditioaal retail and wholesale logistics systems. Rapid reprogramming, priority distribution and repair of critical logistics resources, regional logistics control networks, and flexible transportation systems for inter- and intra- theater logistics support are required for this purpose. RAND's concept for Coupling Logistics to Operations to meet Uncertainty and the Threat (CLOUT) and the prototype Distribution and Repair In Variable Environments (DRIVE) resource allocation model, successfully used by the Ogden Air Logistics Center to improve F-16 aircraft availability, are addressed from this perspective. This paper is a "think piece" on the new logistics concept of operations adopted by the Air Force as an overarching architecture for making the logistics system more capable of responding to sudden and abrupt changes in combat support requirements. It establishes a road map for achieving maximum warfighting potential through systematic changes to vital combat support processes. What needs to be done, the obstacles that stand in the way, and a strategy for accelerating the change process are presented to stimulate thought and action at all echelons of the defense logistics system. The ultimate objective of this paper is to guide strategic planning and implementation of the logistic capabilities the Air Force must have to effectively support combat operations in the twenty-first century.

(SIKU)

Disclaimer Statement

The contents of this paper represent the opinions of the author and do not necessarily represent those of the Air Force Logistics Command and the Air Force.

Distribution

Approved for public release; distribution is unlimited.

Dedication

This paper is dedicated to the memory of **Aristides Sarris**, senior civilian advisor to the AFLC Commander from 1974 until his death in 1982. Art Sarris was a key player in virtually every significant policy decision in Air Force logistics over the past two decades. He was the driving force behind development of AFLC's long-range logistics planning process and served as the Command's spokesman on all major policy issues dealing with the roles and missions of logistics activities within the Department of Defense. He was instrumental in the Command's search for ways to make better use of resources, including adoption of management by objectives, refinement of Air Force and DOD Item Standardization programs, elimination of unnecessary duplication in item management, and improvement of depot maintenance capabilities.

Art Sarris persistently fought efforts to consolidate critical supply functions under the centralized management of defense agencies, when such action threatened to undermine Air Force command and control over vital combat support resources that could prove to be decisive to warfighting success. His testimony to the Readiness Subcommittee of the House Armed Services Committee in March 1982 contributed to congressional rejection of a Deputy Secretary of Defense decision to transfer management responsibility for all consumable items from the Military Services to the Defense Logistics Agency. AFLC is a registered user of 1,392,860 consumable items and today manages 614,420 of these items under the weapon integrated management techniques prescribed by DOD 4140.16M.

This paper is also dedicated to AFLC's CLOUT Program Office and the undaunted spirit of its members who took on the intimidating task of trying to change the basic structure of the Air Force logistics system; the many talented logisticians whose knowledge, insight, and optimism made this paper possible; and last but certainly not least my wife **Gayle**, my daughter **Alicia**, my sons **Jason** and **Kyle**, and my mother **Erika**--each of whom in their own way made very unique contributions to this paper.

Foreword

The Air Force Logistics Command's new motto **"Building Combat Strength Through Logistics"** is a visible reminder that AFLC makes vital and direct contributions to our Nation's warfighting capability and that every decision we in AFLC make will either add to or detract from the operational effectiveness of our combat forces.

AFLC has traditionally been responsible for the wholesale elements of the Air Force logistics system while Major Operating Commands are charged with carrying out the retail functions. In that role, AFLC determines worldwide logistics support requirements, programs funds to acquire needed resources, and allocates those resources to operational forces. Standard logistics management information systems at both the depot and retail level provide the necessary data required to support this process.

A decade of research involving the unpredictability of peace and wartime demands in the field has challenged many of the fundamental principles upon which the Air Force logistics system is based. A new logistics concept of operations has been proposed to remedy existing deficiencies and high-level actions are now underway within the Air Force to make the necessary changes.

This paper provides an AFLC perspective on the basic limitations to flexible and responsive logistics support in a high threat conventional conflict. After establishing a roadmap for change, the paper summarizes the Command's role in seeking appropriate solutions, the lessons learned that have emerged over time, the obstacles that remain to be overcome, and recommended actions. The underlying message is that most of these actions should be taken in the near future to effectively institutionalize the new Air Force logistics concept of operations and ensure that AFLC is immediately relevant in war.

Acknowledgments

This paper would not have been possible without the advice and assistance of many fine individuals who contributed their valuable time and effort unselfishly and with great enthusiasm. I'm particularly thankful for the tremendous patience many of these individuals displayed as the ideas in this paper were given tangible form, shaped, and finally cast into a mold that met our expectations. The following people provided meaningful support to this project.

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APPENDICES

Reader's Orientation

The structure, format, and basic concept for this paper were conceived in December 1987 and approved by Col Donald W. Hamilton, Director of AFLC's CLOUT Program Office (XPC). Efforts to bring those ideas to life continued through February 1988 on a "catch as catch can" basis with higher priority placed on the CLOUT Program Office's main goal of institutionalizing an aircraft availability-oriented resource allocation tool for near-term execution actions within AFLC. Such a decision tool is particularly critical to ensuring that available resources are applied to the highest operational priorities and yield the maximum possible combat capability in today's constrained funding environment.

With phase-out of the CLOUT Program Office on 29 February 1988, the author was dedicated almost full-time to completing this paper while assigned to the Secretariat of the MM DRIVE Task Force. During March 1988, a draft of this paper was circulated for comment to selected functional experts and senior advisors to the AFLC Commander. Their suggested improvements have been incorporated in this paper to make it as accurate and thought-provoking as possible.

Due to its wide scope and depth, it is recommended that the reader peruse the "front-end" of this paper, which concludes with the **Executive Summary (pg ix)**, if time restrictions exist. In recognition that time is a precious commodity and can be an overriding factor, Air Force executives are encouraged to read **Air Force Logistics Concept of Operations (pg 16)** of **Part I - Setting the Stage** and **Appendix A - Depot Support Concept** which summarizes the basic statement of need; **What is at Stake? (pg 30)** and **Why Make the Effort? (pg 41)** of **Part II - Who, What, Where, When, Why, and How?**; and all of **Part III - Gameplan for Future Action.**

If time permits, the reader can skip to special functional areas of interest by selecting the appropriate topic under **Part IV - Structural**

Changes and Resource Impacts. The **Introduction (pg 97)** and **Command and Control (pg 101)** sections of this part of the paper should be of particular interest to all readers.

Finally for anyone with a deep interest in management theory, a quick look at **The Change Process (pg 83)** and **Appendix B - Selected Cybernetic Findings** should pique the reader's interest in a field of study that holds great promise of revolutionizing today's management practices.

Executive Summary

The Air Force logistics system is presently not structured to effectively utilize available resources in peace and war. This deficiency has been recognized by senior logisticians and corrective action is underway. The basic problem centers on the absence of a clearly articulated logistics concept of operations. Forces today must compete for logistics support at the unit level on essentially a "first come, first serve" basis within broad priority groupings that are insensitive to rapid changes in resource status, operational priorities, and the overall needs of the combatant CINCs.

The traditional logistics system is like a cube with two loosely linked but distinctly separate wholesale and retail elements. Recent changes have begun to draw these two elements closer. The new Air Force logistics concept of operations (AFLOGCON) seeks to build on this foundation by providing a definitive architecture for controlling future change.

Analogous to a smooth, rotational sphere, the logistics system under AFLOGCON will rapidly position its critical elements to achieve maximum warfighting capability at the unit level. As needs shift, resources within the system will flow to those units of greatest importance to the combatant CINCs.

Today's logistics processes assume wartime requirements can be predicted accurately enough to identify the resources combat units need to be self-sufficient during the initial 30 days of war. Yet peacetime operations and simulated combat actions have demonstrated that this concept of operations is inefficient in peace and totally inadequate in war. Moreover, air bases in the theaters of war are no longer safe havens from which combat units can operate without significant interference from enemy action. Combat damage to runways, maintenance facilities, prepositioned supplies, and other logistics resources will be extremely high. Continuity of operations under these conditions will require a much greater degree of integration across all air base support functions.

Coupling Logistics Operations to Uncertainty and the Threat (CLOUT) is a RAND research initiative that concluded total reliance on prepositioned stocks may not be adequate to support initial wartime flying requirements. Augmenting unit supplies through regional redistribution of critical parts, lateral repair arrangements in-theater, and depot resupply during the first 30 days of war could lower Not Fully Mission Capability (NFMC) rates from more than 45 percent of a combat unit's aircraft to less than 10 percent if no air base damage occurs and to less than 20 percent when combat damage is factored into capability assessments.

The ability to rapidly transition from a steady-state to meet new or unexpected operating requirements requires that critical logistics functions be sufficiently flexible to realign their priorities and to channel the flow of resources to the highest points of need. Immediate on-equipment requirements should first be satisfied from supplies at the unit, within the region, and then the depot. Off-equipment maintenance should augment this process with mutual support from regional facilities or depot repair. A logistics C2 system must provide the sensitivity, connectivity, and information needed to identify critical support problems, adjust unit priorities, and direct resource allocation. Physical transportation is required to move resources to optimum points of use.

In May 1987, the CLOUT Program Office developed an AFLC Action Plan that identified major objectives, tasks, and actions required to implement this concept at the depot. The thrust of this initiative focused on the Ogden Air Logistics Center's test of Distribution and Repair In Variable Environments (DRIVE). Developed by RAND, this resource allocation model uses Dyna-METRIC-like techniques to prioritize distribution and repair actions for recoverable items based on current asset status and near-term aircraft availability goals at worldwide operating locations. With DRIVE, AFLC's item managers can allocate resources to the highest needs of operational units and make effective adjustments as conditions change. The Weapons System Management Information System (WSMIS) Program Office's success with such models place it in a unique position to make DRIVE a command-wide decision tool that can be expanded to other vital resources in the future.

During FUTURE LOOK 87, actions were initiated to extend this concept Air Force-wide. This step was taken by senior Air Force logisticians in recognition that major deficiencies should no longer be worked without a clear blueprint of how the logistics system should work. Past efforts to control the proliferation of different hardware, software, and the resources required to operate and maintain information systems within the Air Force,for example, had no formal logistics concept of operations to guide corrective action. Similarly, the advanced technology and high performance of current generation aircraft, such as the F-15, F-16, and B-1, have produced state-of-the-art improvements in operational performance; but also created more sophisticated aircraft components that demand far more complex and expensive support equipment and highly skilled maintenance personnel, especially at the organizational/intermediate level. This shift in complexity blurred the traditional distinctions between field and depot workload, and triggered a much greater need to integrate actions among the wholesale and retail elements of the logistics system.

In the 1970s, this overwhelming growth in weapon system complexity caused a phenomenal rise in operations and maintenance support costs. Since new technology is continually applied in developing newer weapons to keep pace with the threat, management attention focused on reforming the defense acquisition system. To correct this problem, weapon system supportability was raised on an equal footing with the traditional acquisition program management objectives of cost, performance, and schedule. This ignited a cultural change toward greater reliability and maintainability (R&M) that has swept through the military services and the defense industry.

Such problems have been handled as separate management issues in the past without fully relating these efforts to the logistics system as a whole. AFLOGCON fills this need by providing an overarching logistics concept of operations that sets forth critical relationships between maintenance, supply, and transportation, as well as other related support processes such as weapon system acquisition, command and control (C2), communication, engineering services, security, and medical support. AFLOGCON can lead to better use of available technology, information systems, organizations, people, and other support resources by ensuring systematic development and

use of management tools that are capable of rapidly matching critical resources at all levels of the logistics system against the highest priority, near-term needs of combat units worldwide.

The complexity and scope of that task require state-of-the-art technology and specialized skills in a number of operations research areas. Mathematical modeling, computer simulation, and an expert knowledge of logistics management information systems are crucial to developing interactive resource optimization techniques and high speed data automation equipment for this purpose.

All logistics support processes can be prioritized in terms of their direct or indirect impact on base/unit operations fully recognizing that each makes a contribution to the creation, maintenance, sustainment, and the inevitable replacement of the force and infrastructure that exists today. By linking direct and indirect combat support functions to force and infrastructure requirements, AFLOGCON establishes a uniform and coherent baseline for Air Force-wide decision-making.

To accomplish such a comprehensive prioritization of logistics functions, AFLOGCON must be institutionalized at all levels of the Air Force as the overarching logistics concept of operations by which all external and internal change actions are judged. New or revised logistics guidance issued by the Office of the Secretary of Defense or the Joint Chiefs of Staff in the form of DOD logistics long-range planning guidance, the Logistics Annex of the Joint Strategic Capabilities Plan, and other policy or program decisions should be filtered through the Air Force logistics concept of operations to determine the impact on the logistics system.

Although corporate commitment to advanced development and AFLC-wide implementation of DRIVE has grown steadily, many of the essential structural changes identified in the CLOUT Action Plan have taken a back seat to make that happen. While many of these changes are closely tied to the decision tools provided by DRIVE, much work remains to define and integrate these changes across the full range of depot support provided by AFLC. Parallel efforts to modify the existing logistics system are

extremely critical in the C2 and transportation areas. Without adequate logistics C2, the information AFLC needs to effectively allocate its combat support resources will be inadequate or unavailable. Similarly, without a preplanned, flexible transportation capability, AFLC will not have the means to move critical follow-on supplies and materiel required during the initial crucial days of war.

AFLC will need a strong System Integration Office (SIO) and corporate commitment to ensure AFLOGCON is implemented effectively across all logistics functions. To achieve this in conjunction with existing functional goals, the SIO should have matrixed support from key headquarters and field staff planning functions. Similar interfaces should be established with other major commands and the Air Staff to coordinate system-wide integration actions. This dedicated SIO network should provide synergistic vertical and horizontal system integration until major system changes have been fully implemented.

Strategic decision-making within DOD and the Air Force is guided by a series of hierarchical objectives that trace their origin to national security policy and strategic guidance issued by the President or the Secretary of Defense. Within that framework, "our highest priority is to improve the readiness of our existing forces." Defense guidance also prescribes that logistics concepts "must keep our forces in a high state of readiness; be able to respond to short warning, rapid deployments; be flexible enough to work anywhere in the world; and be able to sustain combat operations until the industrial base can be fully mobilized . . . and ensure the logistics system operates in the most cost-effective manner possible."

These and other defense planning guidelines are at times too broad, too detailed, and presented without systematic relationships for translating objectives into plans and actions at all levels of the defense logistics system. Complementing the broad DOD guidance, AFLOGCON establishes a more defined set of relationships between all elements of the logistics system and their contribution to warfighting capability. The priority placed on each planning, programming, execution action should be based on its impact

on the present and future force and infrastructure of the Air Force. In this context, the highest priority must be placed at the base/unit level where today's weapon systems are located. As the impact of an ongoing program or new initiative moves away from flightline operations, a lower relative priority should be assigned.

Consistent with defense emphasis on readiness, this approach places a descending order of priority on programs, initiatives, and actions that have less impact on immediate combat capability. A complementary descending order of priority is required for programs, initiatives, or actions that improve the future force/infrastructure of the Air Force. Initiatives yielding near-term payoffs should be assigned a relatively higher priority than those with mid- or long-term returns. Within this two-dimensional space (time and proximity to direct combat capability) all Air Force programs can be prioritized against a common set of parameters.

Programs carried out by AF/RD, for example, will predominantly affect the force/infrastructure in the mid- and long-term except for those acquisition programs that are scheduled to reach IOC or FOC in the near-term. Those in the latter category normally would receive higher priority when budget cuts or funding constraints must be absorbed. Indirect programs, such as personnel recruiting and retention initiatives, should similarly be weighted based on their time-phased impact.

Under this approach, four priority categories guide corporate actions. The highest priority is placed on programs that maintain or improve combat capability at the base/unit-level (Cat I), and in descending order on region or theater capability (Cat II), depot support (Cat III), and industrial sources (Cat IV). Within each of these categories, a distinction is drawn between programs that contribute to the force/infrastructure in the near-term (Cat A - 6 months or less) and the long-term (Cat B - 7 months or more).

The growing complexity of the Air Force force structure, its ripple effect on the infrastructure, and state-of-the-art advances in logistics technology have already produced a solid nucleus for developing regional

and worldwide decision tools that can deal with these requirements. The emphasis on R&M 2000 is already showing signs of reversing the adverse side effects of weapon and support system complexity. Those actions should make the weapon system assessment and resource allocation process less difficult over the long run. They will not, however eliminate the need for a dynamic resource allocation mechanism that can effectively respond to internal and external changes to the logistics environment.

Under the existing logistics concept of operations normal supply actions are interrupted for up to 30 days until the turbulence created by force deployment and employment has stabilized. This "quick disconnect," coupled with almost total reliance on prepositioned WRM during the initial period of war, has produced a requirements void that must be filled. Existing systems must be revised or augmented to ensure critical logistics support will be available during this period with minimum disruption. Greater survivability through hardened facilities, planned redundancy, and rapid transition to high priority, minimum essential processing of critical information at the unit, in the theater or region, and at the depot are needed.

Interim steps to achieve such a capability should build on present systems designed for continuous operations during the peace to war transition. MAC's C2 systems appear to provide a ready made command and control structure that can be integrated with and tailored to the needs of other strategic and tactical units. The logistics C3 architecture for the Pacific Distribution System provides an excellent baseline for standard regional C2 networks required under AFLOGCON, including deployable interfaces with transportable supply systems and a theater asset backup data base that can be regenerated quickly at any of the operating locations using data inputs from the remaining sites.

An essential element of a standard logistics C2 system is a uniform priority allocation technique that provides the combatant CINCs with a reliable means for translating dynamic changes in battlefield conditions into specific unit priorities. Those priorities should be consistent with the relatively stable Force/Activity Designator (FAD) structure of UMMIPS

yet subject to override and rapid readjustment as conditions change. A simple rank order of priority for units in each region or theater would provide a manageable tool for translating the regional commander's priorities into weighted factors for manual or automated resource allocation. This approach would expand the robusting priorities presently used by major commands to support WSMIS UNITREP assessments and build on the ongoing joint LE/XO initiative to develop unit-specific priorities for major theaters of operation. The greatest benefit is the simplicity with which such a priority ranking scheme can be applied in the field under combat conditions. It can also easily be expanded to contractor, joint service, and allied operations in the future.

Cybernetic theory and the study of living systems provide an excellent body of knowledge on the nature of complex control processes that govern animate and inanimate systems. Man's ability to rapidly shift from normal day-to-day activities to a "flight or fight" posture when danger threatens requires countless C2 decisions and integrated action across all bodily functions. These principles govern complex systems and their ability to survive in a hostile and ever-changing environment. This knowledge could prove of value in developing near-, mid-, and long-term C2 improvements to the Air Force logistics system.

Long-range actions should be integrated with RAND's efforts to define an ideal Combat Support C3 (CSC3) system for the future. Under this initiative, RAND will establish a Combat Support Laboratory; identify critical operational measures for combat support; examine alternative theater CSC3 system designs; develop and test base, regional/theater, and worldwide decision aids, and test prototype decision aids in AFLC and theater command post exercises.

Close working relationships between AFLC, RAND, OSD's Defense Spares Initiatives Office, and the operational elements of major commands involved in DRIVE prototype development, test, and implementation actions should be pursued to accelerate the introduction of weapon system and regional priority allocation decision tools within DOD.

The ability to identify resource status and to allocate available resources at all levels of the logistics system to the highest priorities of the combatant CINCs must be matched with a flexible and responsive transportation network that can move critical resources rapidly within the theater or CONUS region and from the depot to the theater under combat conditions. Such a capability should be established and exercised in peacetime to maintain an ideal balance between available logistics resources and the ever-changing needs of operational units. Regional and worldwide logistics control centers should manage critical logistics resources on an area-wide basis with emphasis on immediate operational priorities that consider peacetime readiness and wartime sustainability objectives. This type of operational control over unit-initiated UMMIPS supply actions will ensure that regional and theater CINC priorities directly influence allocation decisions as critical logistics resources are drawn down to unacceptable levels.

Critical resupply for avionics components for the primary weapon systems that will be engaged in Europe is estimated to require three to four flights per day by standard commercial wide-body aircraft. Broad planning factors should be used to derive and update such estimates, and to reserve a portion of the strategic airlift capability for critical non-unit cargo movement. Reallocation of C-141 cargo space, dedicated CRAF flights between CONUS APODs and theater APOEs, direct non-stop flights using LOGAIR aircraft controlled by MAC enroute to the theater, or a combination of these alternatives should be considered to satisfy this requirement.

These and other initiatives to implement AFLOGCON should be governed by an unambiguous statement of the overarching concept of operation, the basic relationships between base or unit-level, regional, depot, and industrial logistics activities, and appropriate strategic planning guidance to ensure all levels of command are guided by a single fundamental criterion for evaluating changes to the logistics system. System integration offices for AFLOGCON should be established at HQ USAF and within major commands, separate operating activities, and direct reporting units to control development and implementation of AFLOGCON.

List of Illustrations

PART I. SETTING THE STAGE

Purpose

This paper is a "Think Piece" on the new Air Force logistics concept of operations (AFLOGCON). As such, it attempts to stimulate thought on what the new concept is all about, how it differs from the concepts we're currently operating under, and the kinds of actions we should take to effectively move it off the drawing board and into actual practice.

The logistics system is never in a steady-state condition. It undergoes continual change in response to new requirements, better ways of doing the tasks at hand, more advanced technologies, shifting resource constraints, and other internal and external needs. This paper identifies significant forces that have shaped the logistics system since Viet Nam, establishes a framework of reference for harnessing those forces, and highlights what needs to be done to make these forces work for us as we proceed to implement the new logistics concept of operations.

In a nutshell, this paper seeks to move our "crosshairs" away from an isolated, fragmented look at the many diverse functional initiatives underway to improve the logistics process and to consider those efforts in a larger sense by elevating our collective sights on the new operating concept and its impact on all aspect of the Air Force logistics system.

Introduction

The title page of this paper is as good a place as any to begin describing where we've been, where we are, and where we're going. As illustrated, the Air Force logistics system has undergone profound changes in recent years. These changes have made the system much more responsive to operational

needs. New management information systems such as the Air Force Central Leveling System (D028), the Weapon System Magagement Information System (WSMIS), and the World Wide Military Command and Control System (WWMCCS); senior forums for Air Force-wide logistics debates such as the semi-annual FUTURE LOOK and Logistics Conferences; and dedicated inter-command liaison programs are among the many new capabilities that have effectively narrowed the artificial separation between the wholesale and retail segments of the logistics system. [1] Largely made possible by advancing technology, such structural changes have improved management of the total logistics resources in the system by making trade-offs between depot and base requirements more visible in terms of weapon system availability at all levels of decision-making. These changes have also resulted in the relocation of selected depot capabilities in-theater to assure more effective response to theater requirements. [2] AFLC's logistics management systems (LMS) modernization program is starting to infuse the logistics system with the highly interactive, real time information networks we need to effectively integrate wholesale and retail logistics operations.

The traditional logistics system can be likened to a "cube" with two loosely linked but distinctly separate wholesale and retail elements. Recent changes have, in effect, begun to draw these two elements closer

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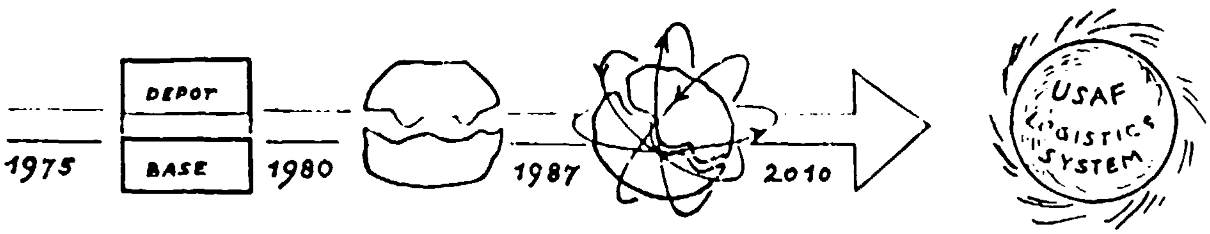
1 D028 allocates organizational and intermediate maintenance (OIM) spares requirements to each base using marginal analysis techniques that minimize base-level backorders. The reliability and sustainability assessment modules (RAM/SAM) of WSMIS use Dyna-METRIC techniques to assess the weapon system capability provided by peacetime operating stocks (POS) and prepositioned assets on-hand at each base. HQ AFLC and the Air Logistics Centers are now connected with all major operating commands (MAJCOM) by the WWMCCS.

2 AFLC's Support Centers in Europe and the Pacific (SCE/SCP) provide selected intermediate/depot maintenance and forward stockage support in-theater. The European and Pacific distribution systems (EDS/PDS) provide a dedicated capability for redistributing critical supplies within the primary theaters of operation.

and smoothed many of the rough edges that have made the overall system extremely stable but relatively inflexible in dealing with the fast-paced changes that occur at the operational level. The new AFLOGCON builds on these evolutionary events and accelerates the change process. It does this by providing a more definitive architecture and the necessary blueprints for system integration and control over future changes.



Analagous to a smooth, rotational "sphere," the enhanced logistics system envisioned under AFLOGCON must be capable of rapidly positioning its critical elements to respond to external needs. Internally, key elements of the logistics system should be well integrated to ensure available resources are effectively utilized to achieve maximum warfighting capability at the unit level. As the point of need shifts on the surface of the sphere, available resources within the system must flow quickly and uniformly to those units with the greatest need and highest priority. The structural changes required to make this happen are expected to be fully implemented within the next twenty years.

Background

In March 1987, the senior logisticians of the Air Force met during FUTURE LOOK 87 to examine the overall state of the logistics system from a strategic planning perspective. Two briefings during this conference focused on the basic concept of operations for the Air Force logistics

system.

The first of these was AFLC's presentation on "The Future of Logistics." This briefing suggested that the existing Air Force logistics system is not structured the way it should be to effectively respond to the unplanned events that will be encountered in a high intensity, conventional conflict. The proposed solution--to fully integrate and link vital elements of the logistics system directly to operations to meet peace and wartime uncertainties--struck at the heart of the problem.

Today's logistics practices and processes assume that wartime requirements can be predicted accurately enough to identify the basic resources direct combat units need to be self-sufficient during the initial 30 days of war.[3] During this critical period, maximum self-sufficiency is considered absolutely essential to ensure continuity of operations as units transition from peace to war. Operational continuity would otherwise be threatened by the inevitable resupply interruptions associated with massive worldwide movement of forces from their present peacetime locations to the planned wartime operating sites under hostile conditions. The 30 day transition period during which prepositioned war reserve materiel (WRM) is the sole source of supply for almost all combat coded units is considered sufficient time to reestablish normal resupply between the operating units at the retail level and their wholesale counterparts.

AFLC suggested that enough evidence was now in hand to challenge the assumptions upon which the current logistics concept of operations was

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[3] Prepositioned stocks for certain units deployed at the onset of war are configured to support only 15 days of operation. For these units, mobile maintenance support in the form of an Avionics Intermediate maintenance Shop (AIS) is required to reduce resupply requirements through remove, repair, and replace actions.

based and proposed specific changes that would make the entire logistics system more flexible and responsive to both peace and wartime needs.

The second briefing dealt with the findings and recommendations of Project RELOOK. Conducted by the Air Force Logistics Management Center (AFLMC), this study focused on the problems encountered during SALTY DEMO.[4] The conclusions reached by RELOOK underscored the fact that air bases in the European theater of war could no longer be considered safe havens from which combat units can operate without significant interference from enemy action. Combat damage to runways, maintenance facilities, prepositioned supplies, and other logistics support resources will be extremely high. Continuity of operations under such conditions will require a much greater degree of integration across all air base operations support functions than presently exists. More importantly, however, RELOOK concluded that sortie generation capability in such an environment will be a function of how well the air base uses its available resources. In the face of a much higher threat, RELOOK recommended that immediate action be taken to make air bases more self-sufficient (1:9-10,33).

As a result of these twin pressures for change, a joint Air Staff/MAJCOM Tiger Team was tasked to examine the existing logistics concept of operations and to brief recommended changes for improving the concept during the next Worldwide Logistics Conference in September 1987. A parallel examination of the Air Force logistics command and control (C2) process was also directed and a separate Tiger Team established for this purpose.

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[4] SALTY DEMO was a 1985 air base survivability exercise that simulated combat conditions air bases in central Europe would have to cope with during the initial phase of a high intensity conflict. The exercise results demonstrated that the existing air base would be extremely hard pressed to respond effectively to dramatic and sudden loss, damage, and disruption caused by heavy ground and air attacks.

CLOUT

To better understand AFLC's concerns and leadership role in this area, a quick look at the CLOUT program is in order. Coupling Logistics to Operations to meet Uncertainty and the Threat (CLOUT) is an acronym coined by the RAND Corporation for a series of research initiatives jointly sponsored by AFLC and the Air Staff in 1984. [5] Viewed as a potential solution for dealing with the highly uncertain and dynamic conditions we can expect to encounter during the initial period of war and billed as an overarching logistics concept of operations, CLOUT grew out of research during the early 1980's on actual failure patterns of key recoverable spares at selected TAC air bases. This research established that peacetime demands for critical weapon system components at the unit level significantly fluctuate not only over specific periods of time but also across worldwide locations as illustrated in Fig 1.

These demand variations were found to be significantly greater than the expected demands computed for each operating location by standard base and depot supply systems. (2:36) Based on estimated or actual demand rates experienced in the past, the traditional requirements computations were shown to be relatively insensitive to such fluctuations. For many critical spare parts, the probability that serviceable on-hand stock authorized at any one operating location would, in fact, meet actual needs was determined to be low. This was found to be particularly true for items that have experienced high demand variability in the past and for complex items

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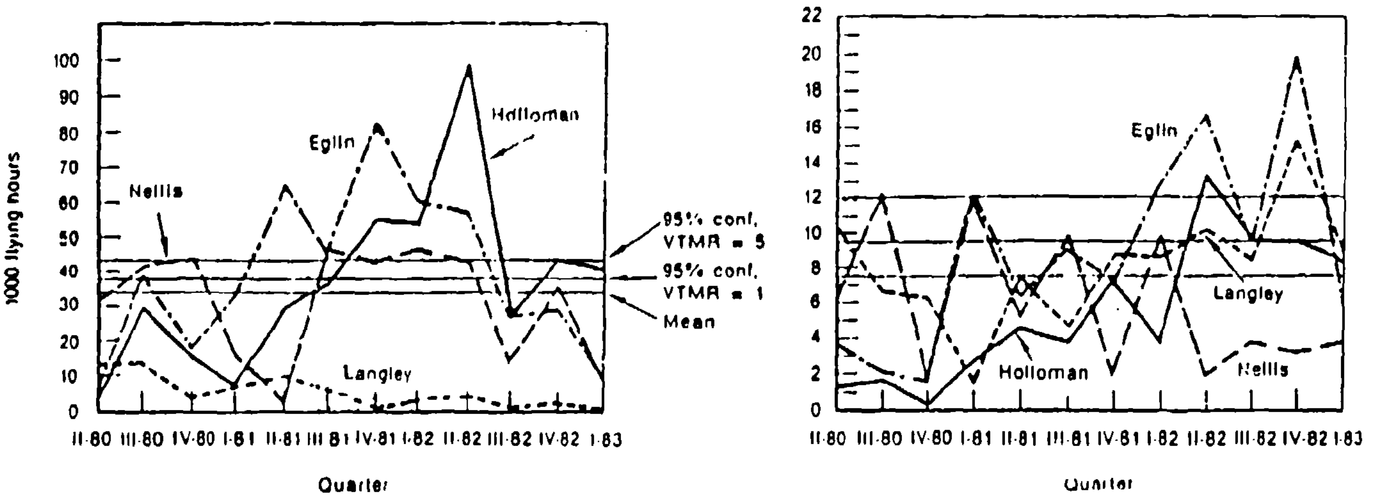
[5] RAND is a non-profit Federal Research Center chartered by Congress to provide an independent view on selected defense and non-defense programs. Under Project AIR FORCE, RAND (which originally focused on research and development) examines all aspects of the Air Force's operations, including its organization and management practices. Normally sponsored by a two-star Deputy Chief of Staff (DCS) at HQ USAF, the Uncertainty Studies proved to be the first time that a major command co-sponsored RAND research.

with a large range of component parts.[6]



Main landing gear wheel demands per 1000 flying hours (average VTMR = 51.9)

Converter programmer demands per 1000 flying hours (average VTMR = 9.0)

Fig 1. Demand Variability of Critical Components at TAC Bases. (2:12-14)

To fully appreciate the significance of this, one must understand that requirements based on average demands will normally satisfy future needs if all requirements factors (e.g., planned operating program, pipeline times, etc.) remain unchanged. If changes do occur, safety levels provide a certain amount of protection. This level of protection, however, is geared to the average demand and the fluctuations around that average.

Based on a higher economy of scale at the wholesale level, worldwide demand history provides a more stable baseline for determining future requirements

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[6] Demands varied not only over time and by location but across critical, high cost items. Buying additional stock was determined to be prohibitively high and counterproductive since variability in demand can suddenly shift among these items. These demand uncertainties are, of course, compounded by the uncertainties of combat loss or disruption.

than past demands at the base level.[7] For example, if 100 demands are expected at the depot for an item that is used at 50 bases, a great deal of uncertainty may exist as to just how many items may actually be needed at any particular base. For items with extremely stable demand patterns, two items at each base may be sufficient to satisfy the anticipated demand. For items with less demand stability, 10 items may be needed at every base to provide reasonable assurance of support. Buying additional spares, say 500 for the 10 per base requirement would be a feasible solution in the latter case if demand variability does not change over time, if we had unlimited dollars to acquire and store these high cost items, and if combat loss or damage were not a factor.

Continuing with the above example, traditional wholesale requirements techniques essentially determine that every base should have two items for peacetime operating stock. Prior to 1982, bases requisitioned items from the depot to fill individual base stock levels computed by the standard base supply system using actual demands experienced at each location. In essence, each base's past usage determined how the available POS assets in the system would be allocated by the depot for routine replenishment actions.

In 1982, the D028 system was introduced to improve this allocation process. Using marginal analysis techniques to minimize worldwide backorders, this central leveling system does not treat past demands at each location in isolation. Instead, the probability of a stock outage is computed systematically across all locations for each recoverable item using the

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[7] CORONA REQUIRE found that even at the wholesale level this stability is not as great as it may appear to be in theory. Between Mar 80 and Mar 82, for example, the FY82 requirement for replenishment spares increased from $1.5 to $3.3 billion. Such drastic fluctuations challenge our ability to forecast peacetime requirements with reasonable accuracy. (3:2)

latest wholesale demand data available at the depot. The actual stock levels provided by D028 to each base, therefore, minimize expected backorders across all worldwide locations.[8]

Prepositioned spare requirements prior to 1975 were manually computed for wartime tasked units fully considering each essential item's wartime operating program, wartime factors (e.g., failure and wearout rates, repair cycle times, NRTS percents, etc.), and the wartime support process. The elements for the prepositioned requirements computation were assumed to be identical to those used in the peacetime computation or adjusted if significant differences were expected under wartime conditions.

In 1975, this manual process was mechanized with the introduction of the WRSK/BLSS Authorization System (D029) system. In addition to automating the process, this system also applied marginal analysis techniques across the range of items in each prepositioned kit to minimize expected backorders during the support period.[9] Joint AFLC/MAJCOM reviews were conducted annually to ensure these kits were configured as closely as possible to actual operational needs.

Under the existing logistics concept, units rely on POS and War Readiness Spares Kits/Base Self-sufficiency Spares (WRSK/BLSS) to meet immediate peace and wartime needs. When actual demands exceed expected demands

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[8] Based on an AFLMC study initiated in 1985, the D028 system was changed from a monthly to a quarterly stockleveling frequency in response to extremely turbulent stock level fluctuations encountered at the bases. This change suggests that persistent demand variations occur at the unit level under peacetime operating conditions. (4:35,36)

[9] As with D028, the marginal analysis techniques of D029 consider tradeoffs between the unit cost of an item and the degree of backorder protection derived for a specified stock investment or fill rate. Marginal analysis tends to favor stockage of lower cost items because more items per dollar invested can be made available to offset expected demands for POS.

computed for each unit, requisitions are submitted to the depot for replenishment action. As illustrated in Fig 2, main operating bases (MOBs) today compete for scarce resources using the "first in, first out" priority

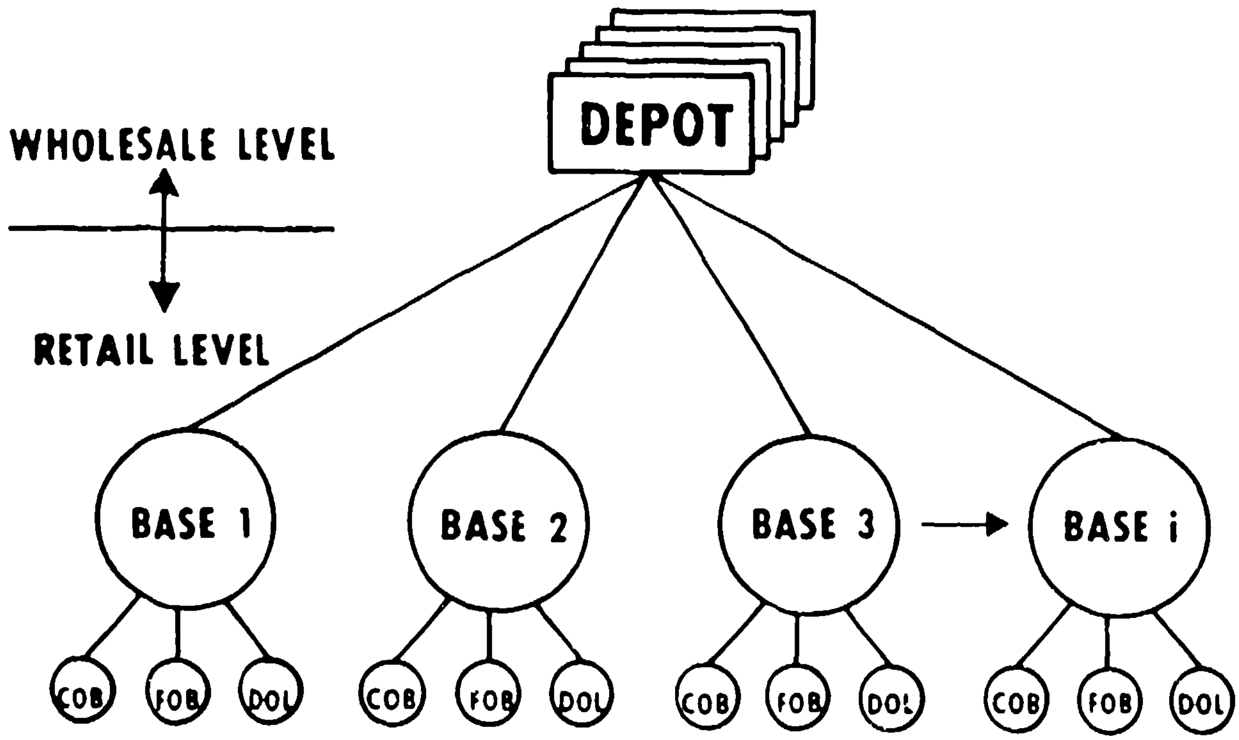

Fig 2. Traditional Depot/Base Relationship.

allocation scheme established by the Uniform Materiel Movement and Issue Priority System (UMMIPS).[10] The wholesale Item Manager can respond to these requisitions by shipping available assets at the depot to the bases,

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[10] UMMIPS priorities for worldwide forces are based on five Force Activity Designators (FAD I-V) that are structured to reflect a unit's planned employment in combat operations and three Urgency of Need Designators (UND A/B/C) that distinguish supply needs in terms of normal replenishment, anticipated impairment of mission capability (MICAP), and actual MICAP conditions. To distinguish among competing programs, the Air Force has further refined these priorities by establishing 10 precedence ratings within each FAD (except FAD I which is limited to 5).

redistributing assets among the bases, expediting depot repair, or accelerating delivery of new items from the source of supply.[11] With an average procurement leadtime in excess of two years, the Item Manager is normally not in a position to "buy out" supply problems created by sudden shortages in the field. More importantly, buying additional spares to resolve a temporary problem can be counterproductive over the long run, especially for items with low condemnation rates, by adding to long supply or excess stocks that tie up funds needlessly.

Given these realities, RAND research highlighted that the Air Force logistics system is relatively inflexible and not structured to effectively deal with the system-wide demand variations that occur across multiple operating locations. This rigidity is largely the result of the underlying assumption that peacetime and wartime demands can be predicted with reasonable accuracy for the planned force activity at each operating location. Given that assumption, each unit is, in theory, provided with the POS and base repair capability to sustain its operations during the order and ship time it takes (based on past experience) for new supplies to arrive from the depot in support of follow-on operations.

Under this concept of operations, the depot becomes the primary "Lifeline of the Aerospace Team"[12] for each base as illustrated in Fig 2. Items that cannot be repaired by a base (e.g., Not Reparable This Station - NRTS) are shipped to the depot for repair and eventually returned to the field in

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[11] There are, of course, many other actions the Item Manager can take to reduce the impact of supply problems in the field. Technical Order specifications, for example, can be changed to extend service life and replacement criteria, temporary special repair procedures may be authorized, an item may be modified, etc. Such actions, however, depend on the nature of the item and the underlying cause of the problem.

[12] Until recently, this was AFLC's motto. The new motto, "Combat Strength Through Logistics," approved by the AFLC Commander in Nov 87, provides a much greater degree of flexibility when viewed from a CLOUT perspective.

serviceable condition. Items that wear out are, of course, replaced by the depot as necessary. In terms of actual volume and time, the flow of these items from the flight line through the retail and wholesale echelons of the logistics system becomes the foundation for determining future requirements.

While the overall relationship between the depot and bases must remain intact to provide continuity of operations over time, the Uncertainty Studies conducted by RAND under Project Air Force provide persuasive evidence that significant and unpredictable fluctuations in demand occur at base-level during peacetime operations. Dyna-METRIC assessments [13] of these demand variations indicate that more than 45 percent of a combat unit's aircraft could become Not Fully Mission Capable (NFMC) as a result of avionics shortages alone during the initial 30 days of war. (5:26-28)

These findings suggest that total reliance on prepositioned stocks to carry a unit through this critical period--as required under the current concept of operations--provides a strong foundation that may not be sufficient by itself to support initial wartime flying requirements. In exploring other alternatives, such as augmenting unit prepositioned supplies through regional redistribution of critical parts, lateral repair arrangements in-theater, and depot resupply during the first 30 days of war, Dyna-METRIC assessments established that unit NFMC rates could be lowered below 10 percent with no air base damage and to less than 20 percent under simulated combat damage.

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[13] Dyna-METRIC assessments simulate the flow of recoverable items from the flight line through the supply and maintenance echelons that support operating requirements. This technique relates individual Line and Shop Replaceable Units (LRU/SRU) directly to weapon system availability on a day-by-day basis over the planned operating period. (6:v-ix)

To achieve these benefits, the CLOUT concept advocated the establishment of a highly interactive logistics system that is directly linked to the immediate but ever-changing needs of combat units. Under this concept, key elements of the retail and wholesale logistics system would be highly integrated to effectively prepare for and react to the highly dynamic needs of warfighting units. The ability to rapidly transition from a steady-state condition to meet new or unexpected operating requirements requires that critical logistics functions be sufficiently flexible to realign existing priorities and channel the flow of available resources to the highest points of need as illustrated in Fig 3.

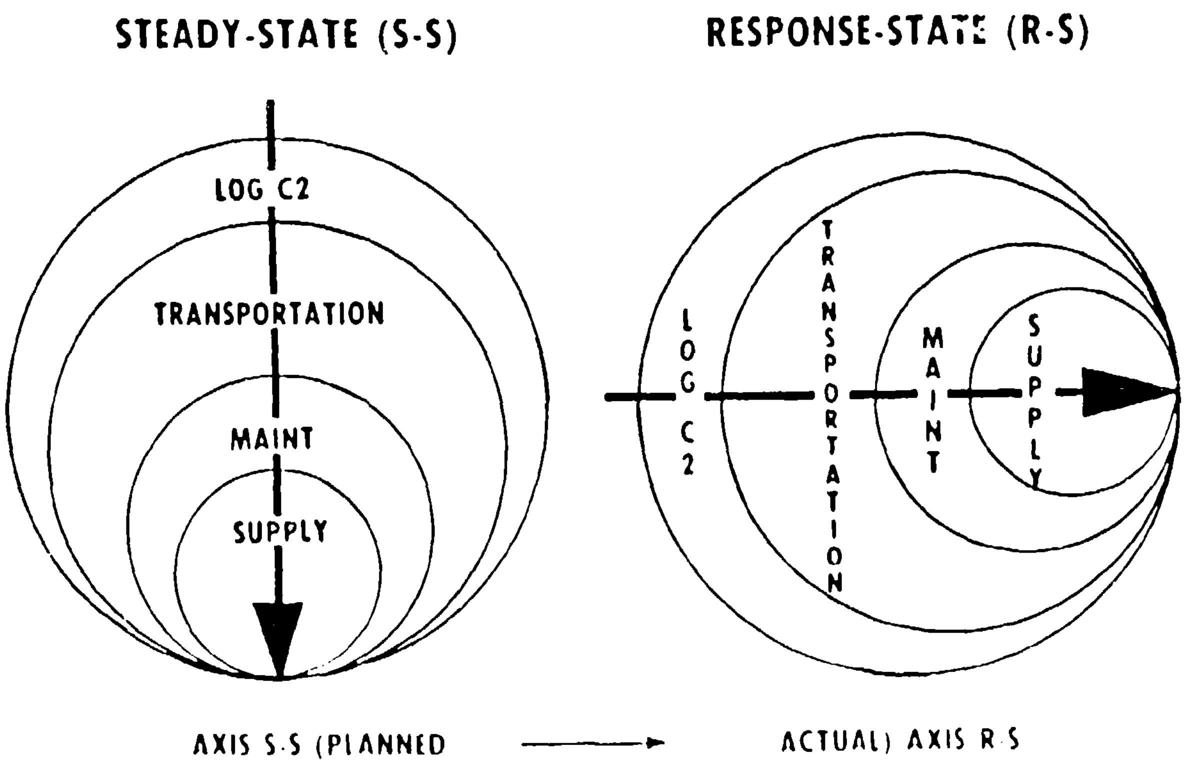

Fig 3. Logistics System Reaction Process.

Immediate on-equipment support is obtained from supply through POS and WRSK/BLSS serviceable stocks on-hand at the unit, within the region, or

from the depot as a last resort. Augmenting this capability is the off-equipment maintenance provided on-site by the unit, through mutual support from regional facilities, or by the depot. Physical transportation of critical supplies and materiel between logistics operating activities is essential to ensure effective movement of resources to the optimum points of use. A logistics C2 system must provide the sensitivity, connectivity, and information exchange needed to identify critical logistics support problems, establish and adjust unit priorities, and to direct the resource allocation process at all echelons of the logistics system to achieve maximum combat capability at any point in time. (7:1-15)

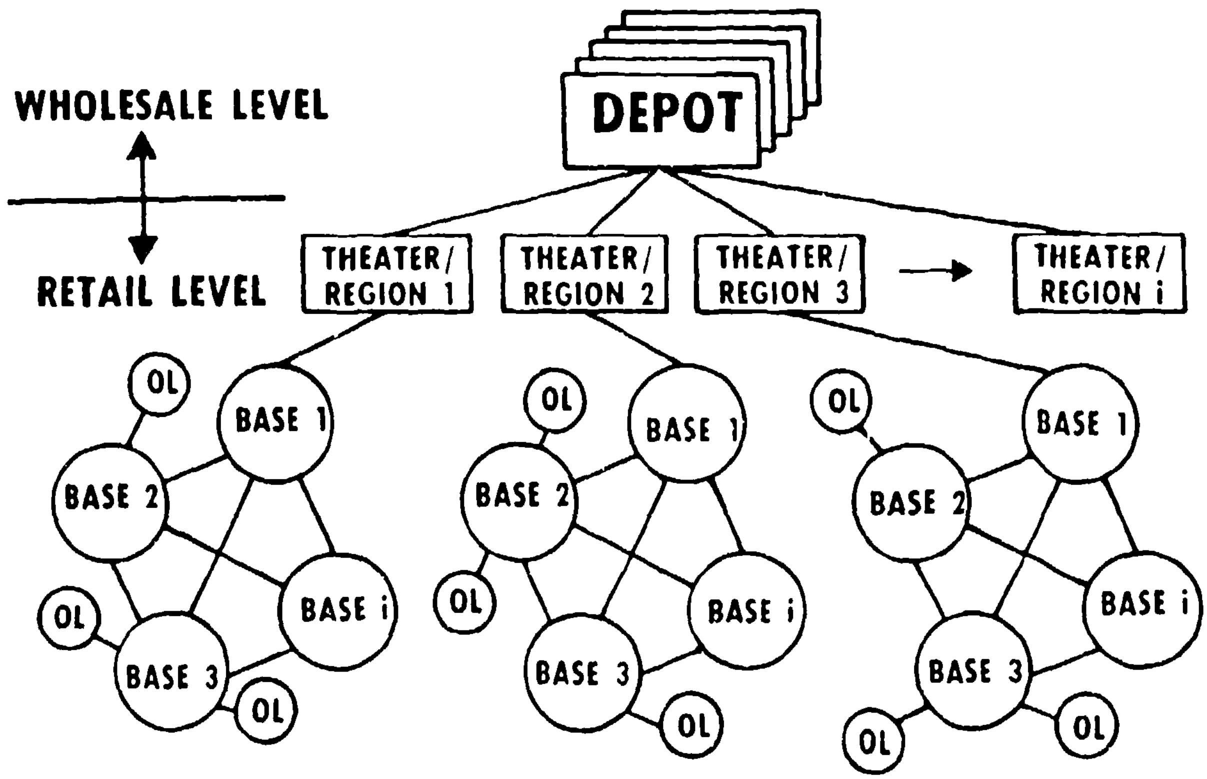

Fig 4. AFLOGCON Depot/Base Relationships.

In contrast to the traditional depot/base relationship shown in Fig 2, the depot/base relationship envisioned for AFLOGCON is illustrated in Fig 4.

The changes required to make existing air bases and their supported operating locations (e.g., collocated operating bases, dispersed operating locations, and forward operating locations) a part of this interactive logistics network have been defined in greater detail. Work is progressing within AFLC to develop, test, and implement the tools needed to put the most attractive features of this concept into practice. (8:1) Much of that work builds on RAND's original CLOUT concept of operations illustrated in Fig 5.

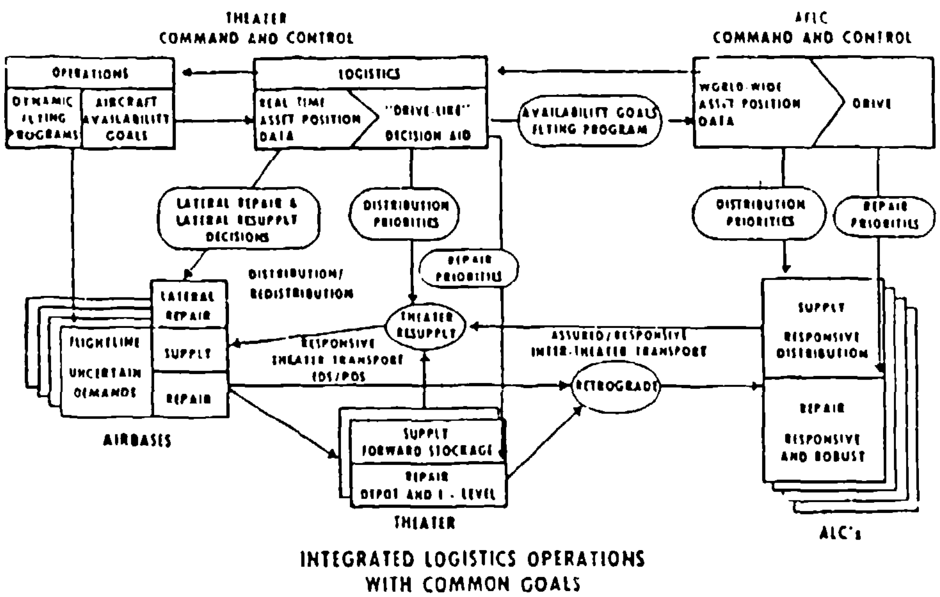

Fig 5. RAND's Illustration of the CLOUT Concept.

Air Force Logistics Concept of Operations

In response to the tasking from FUTURE LOOK 87, an Air Force Tiger Team examined the various initiatives currently underway to improve the logistics system as a first step in developing a formal AFLOGCON. During a meeting in June 1987 at the Air Force Logistics Management Center, the team received briefings from the MAJCOMs on what that concept should look like.

AFLC's briefing to the team described how today's wing is structured, the concept of operations currently in effect at the air base and the depot to support wing operations, the key assumptions upon which this concept rests, and why those assumptions are no longer valid.[14] We pointed out that the existing logistics system really doesn't provide the kind of linkage between logistics and operations required to effectively support sudden and abrupt changes in operational priorities and near-term flying programs. The theater of operation doesn't have the capability to quickly and effectively draw on all of its logistics assets consistent with those changing priorities and needs. Nor is the depot postured to respond to the full range of critical needs that are certain to be encountered in-theater during the initial period of war.

To achieve maximum combat capability during this crucial period of operation, the CLOUT Program Office stressed that the logistics system must be structured to provide assured command, control, and communications within and between theater and depot logistics elements to effectively convey immediate needs to key decision-makers. Armed with current visibility, resources at all echelons of the logistics system can be allocated to the highest priorities at the operating level. Assured transportation of critical supplies within the theater and between theaters and the depot must be planned for and provided during the initial period of war to follow through with actual resource decisions. In addition to this description of what was needed to make the logistics system more capable of dealing with the uncertainties of war, the specific mechanics of how this should be done were presented as shown in Fig 6.

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14 Presented by Col Al Ramroth, the first Director of AFLC's CLOUT Program Office, this briefing, entitled "AFLC Logistics Concept of Operations," intentionally avoided use of the term CLOUT in response to misperceptions and controversies that had surfaced during prior briefings on CLOUT and the CLOUT/RELOOK conflict over base self-sufficiency.

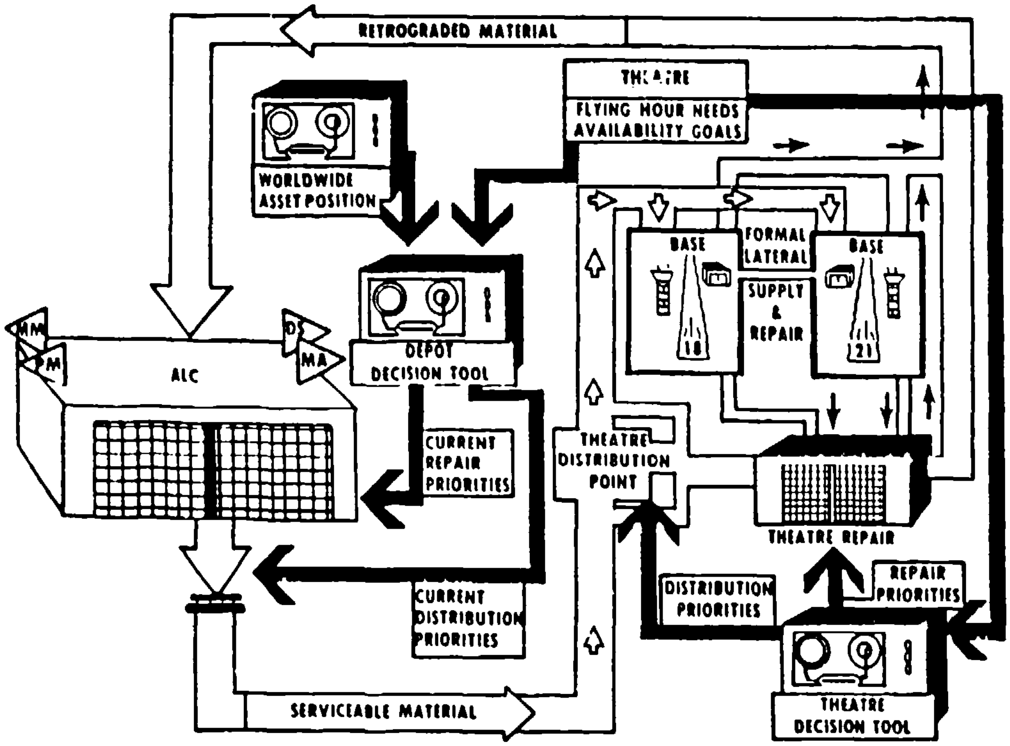

Fig 6. AFLC's Initial Concept for CLOUT.

Key theater elements (right side of diagram) under what had previously been briefed as the CLOUT concept included a theater commander's priority system that is sensitive to real time changes in operational requirements, a resource allocation tool for getting the most out of available theater resources, forward distribution points and dispersed repair facilities, and formal lateral supply and repair capabilities in support of all fixed base and deployed units within the theater.

Key depot elements (left side of diagram) include a complementary resource allocation tool to guide depot repair and distribution actions, access to current asset status and weapon system availability goals at worldwide locations, and inter-theater transportation to move critical supplies and materiel to the battlefield as needed.

Although easier to understand than the original RAND illustration of the CLOUT concept shown in Fig 5, what needed to be done was still complex and overwhelming. And it became clear that no matter how the concept was dressed, major structural changes to the logistics system would be required to effectively deal with the known peacetime and wartime uncertainties. The political repercussions of advocating such changes along with the normal resistance to change put the Tiger Team in a very challenging position. [15] Since senior logisticians were aware of the basic problem and several possible approaches to a solution, the only question that remained was what form the new logistics concept of operations should take. From the reactions to RAND and AFLC briefings on CLOUT, it became clear that more would be lost than gained if CLOUT were adopted "as is" and advocated as the preferred solution.

In response to this dilemma, the Tiger Team published a draft concept of operations that identified the overall need for a flexible and responsive logistics system--one that could effectively deal with the many complexities and uncertainties associated with peace and wartime operations. Initially comprised of eight primary elements--C2, Mutual Support, Depot Support, Forward Support, Allied/Joint Support, Inter-Theater Transportation, Intra-Theater Transportation, and Mobility [16] --the new operating concept failed to provide, however, a cohesive architecture

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[15] CLOUT briefings by RAND and AFLC had highlighted specific shortcomings of the logistics system at very high levels within the Air Force and DOD. Although no one disagreed that these shortcomings were real and should be dealt with, changes such as the proposed centralized control over critical resources, the ability to achieve "assured" C2 under wartime conditions, and expanded "assured" transportation with a 66 million ton-mile shortfall were among the many controversial issues that made the CLOUT concept difficult to sell.

[16] Air Base Operability was later added and recognized as the cornerstone of AFLOGCON since the combat support structure must be geared to respond to the immediate needs of the fighting unit. A general description of each element and its significance to combat operations is provided in Reference 9 and 10.

for tying these diverse elements into an integrated system. (9:2-9)

In recognition of the significance of this effort, the team developed a recommendation that this generalized concept of operations be institutionalized through the long-range strategic planning process and implemented through individual concepts of operations tailored to each MAJCOM's unique needs. Under this approach, the Air Staff's role in providing overall direction and focus was acknowledged but subordinated to MAJCOM, theater, and unit commanders "who, using the 'tools and techniques' provided, must, in the end, determine how to achieve maximum base operability." (10:11)

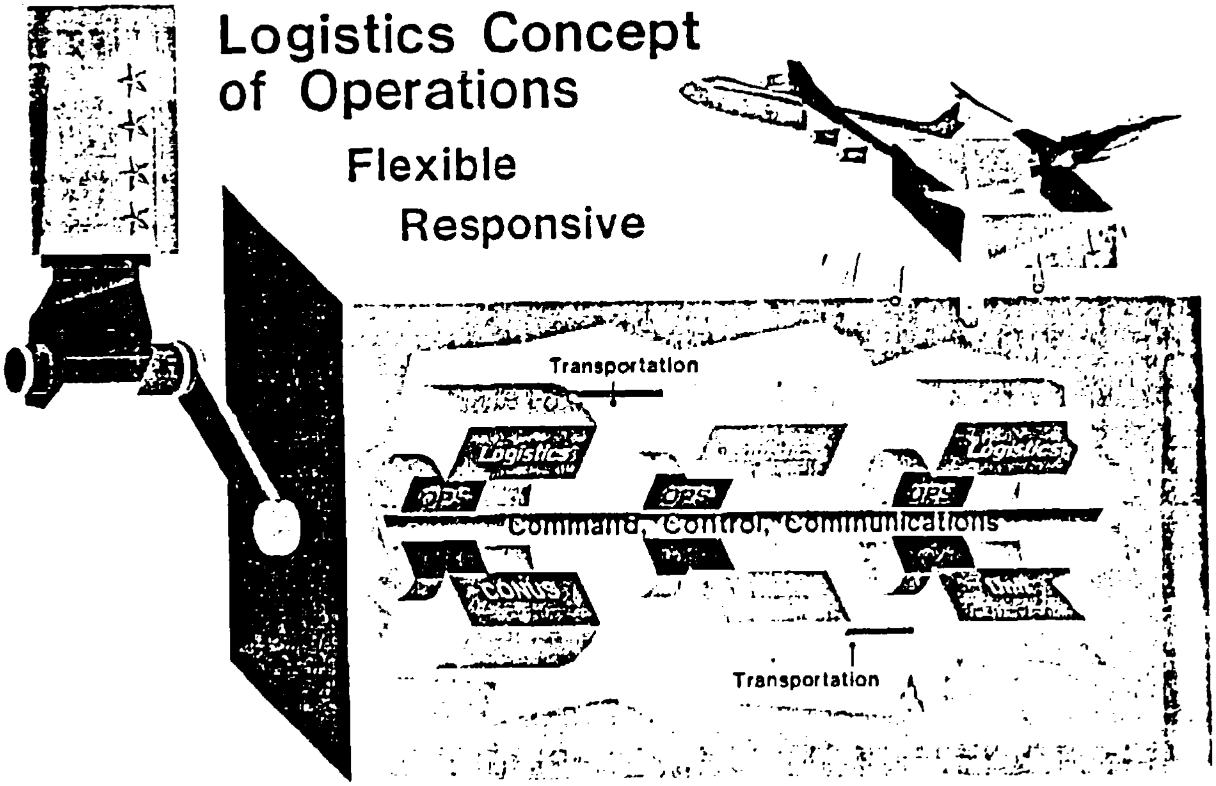

Fig 7. Air Staff Illustration of AFLOGCON.

At the end of September 1987, the new logistics concept of operations illustrated in Fig 7 was briefed to senior Air Force logisticians during the Worldwide Logistics Conference at Kadena AFB, with the recommendation that the proposed concept become a baseline for future strategic planning within the Air Force. [17]

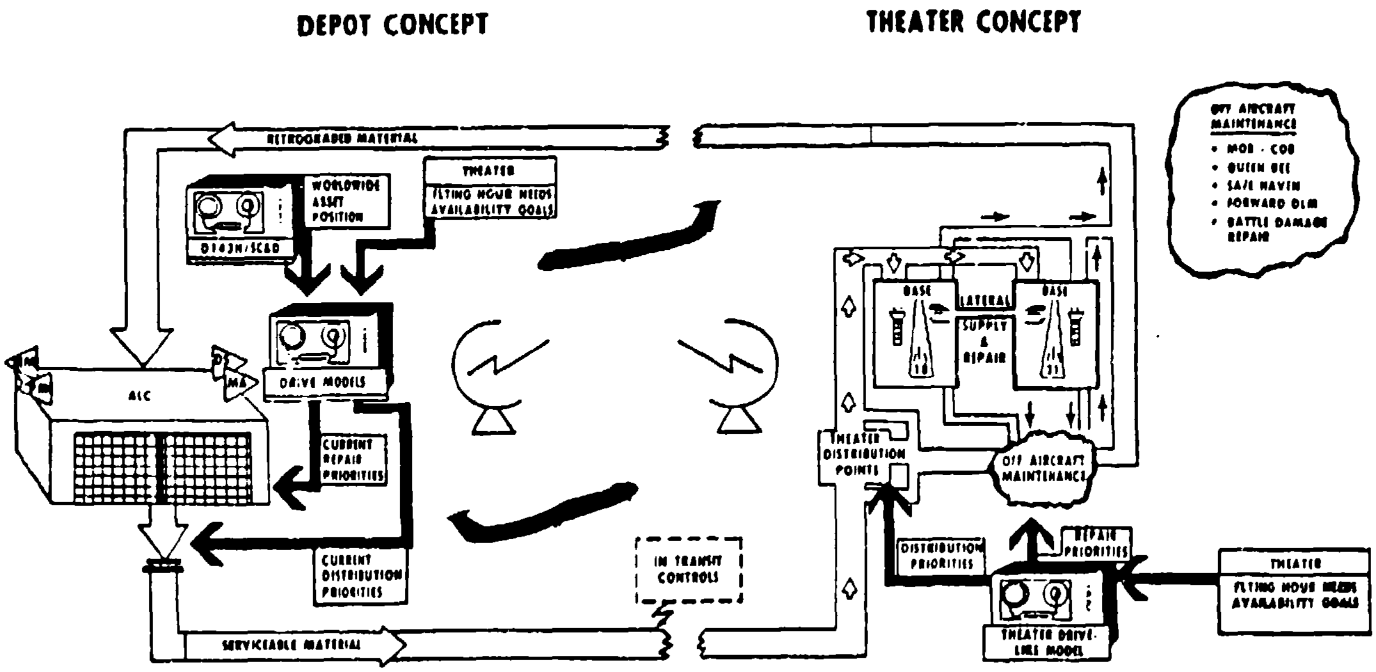

Fig 8. AFLC's Revised CLOUT Concept.

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[17] A strawman of this briefing was presented to the Logistics C2 Tiger Team in early Sep 87 without a "wiring diagram" comparing the old and the new concepts. We suggested that a specific blueprint of the existing and proposed concepts be added to answer the obvious question "How does the new AFLOGCON differ from what we've been operating under?" and to guide system-wide implementation. The briefing was later modified to include the depot portion of AFLC's proposed concept of operations shown in Fig 8; however, the theater portion was not included. It should be noted that significant changes to AFLC's theater concept (Fig 6) were made by Col Don Hamilton, who became the second Director of AFLC's CLOUT Program Office in Aug 87. These changes clarified controversial issues surrounding centralized control and consolidated repair in-theater.

This proposal was endorsed and subsequently resulted in direction to define the theater concepts of operations and to brief, during FUTURE LOOK 88, progress toward making AFLOGCON a direct link between the combat support doctrine in AFM 1-1 and the Air Force planning, programming, and execution process. In conjunction with that effort, AFLC was also tasked to brief status on actions taken to develop DRIVE as a prototype tool for prioritizing depot-level repair of spares. (11:1-5)

In early November 1987, Air Staff and MAJCOM strategic planners met at McGuire AFB to realign the Air Force's strategic planning objectives under the nine elements of AFLOGCON and to establish near, mid, and long-range goals to guide implementation actions over the next twenty years. Draft theater concepts of operations are presently being developed by the MAJCOMs for this purpose and an Air Force Action Plan is anticipated to be published in mid-1988 to provide more specific direction.

PART II. WHO, WHAT, WHERE, WHEN, WHY, AND HOW?

Who Is Involved?

Internal structural changes to the Air Force logistics system are implemented through formal approval by senior Air Force leaders. To the extent that the Air Force logistics system is a part of the overall defense logistics system, fundamental changes that alter the basic logistics framework established by DOD Directives and standard military logistics systems must also be approved by senior defense officials. Since such changes could also impact the National Supply System and related government-wide support processes, senior officials of federal agencies and regulatory commissions within the Executive Branch may also become involved. It goes without saying, that legislative oversight of national defense activities could easily lead to congressional intervention in any change action that may require statutory approval or falls within the specific sphere of interest of House and Senate committees, such as the Armed Services, Appropriations, and Government Operations Committees.

Although the concept behind AFLOGCON has been briefed to senior logisticians within DOD, [18] the need for fundamental change has not, as yet, produced externally directed action to accelerate development and implementation of the policies and system modifications required to institutionalize this concept within the Air Force. External influences of this nature may be brought to bear, however, as the concept becomes more defined and its practical value is demonstrated through actual application in daily logistics operations.

CLOUT concept was widely briefed by AFLC to senior leaders, such as the DLA Director, SAF/ALG, Army DCS/LOG, and ASD (P&L) in 1987 and accepted as a worthwhile initiative for improving combat capability. RAND briefings on the Uncertainty Studies and CLOUT have been given to senior JCS and OSD staff members with positive results. General Alfred G. Hansen, AFLC Commander, co-sponsored the Uncertainty Studies in 1984 as AF/LEX and was later briefed on the progress of this initiative as JCS/J-4.

The primary change agents within the Air Force are the senior Air Staff and MAJCOM logisticians whose responsibility is to see that the logistics system is postured to provide the most combat capability it can within the resource constraints that exist at any given point in time. These logisticians are in the right position to evaluate how well the logistics system performs that function, to identify specific changes that will improve the process, and to take the necessary actions to see that these changes are made as soon as possible.

Under the sponsorship of AF/LEX and AFLC/XP, the RAND Corporation has applied resources to define the need for change and to recommend alternatives to existing concepts, business practices, and institutional processes. The complexity and scope of that solution require state-of-the-art technology and specialized skills in a number of operations research areas. Mathematical modeling, computer simulation, and an expert knowledge of existing and planned logistics management information systems are crucial to the development and implementation of AFLOGCON. Within AFLC and the Air Force, such skills have become more and more available as emerging technology has made it possible to improve the logistics support process through use of interactive resource optimization techniques and high speed data automation equipment.[19] This technology has been spread to a large part of the logistics workforce through personal computers, remote terminals, local area networks, and intersite gateways that provide near-real time connectivity among and between CONUS and theater logistics activities.

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[19] The shift from commodity to weapon system management has gained momentum as advanced mathematical and computational tools have routinely been used to establish optimum support relationships between individual items of supply and the weapon systems on which they are used. Similar optimization techniques and faster automation of routine but manually time consuming tasks have also been applied to supply, maintenance, transportation, and other logistics support functions in recent years.

Despite these positive developments, the logistics system is just beginning to take advantage of the benefits of this advanced technology. As the technology is matured and proves to be more effective than traditional management tools, the full potential of this capability will be realized. The key to how fast that potential is actually achieved, however, depends in large part on the acceptance and routine use of these tools by the logistics workforce.

The functional experts who make up a large percentage of that workforce (e.g., item managers, system managers, equipment specialists, production management specialists, maintenance schedulers, etc.) on the whole do not have the technical operations research knowledge and experience to fully understand how these tools are constructed, but must nevertheless be convinced that logistics operations can be more productively carried out when these tools are properly applied. Performance measures that relate specific functions to increased or decreased weapon system capability in the field must be established to provide the critical feedback needed for this purpose.

To speed this process, AFLC established a CLOUT Program Office in November 1986 and dedicated a small cadre of people to the task of defining the CLOUT concept in more detail; to manage the test, evaluation, and implementation of CLOUT initiatives within the Command; and to advocate Air Force-wide action to make the logistics system more responsive to near-term operational needs. This program office initially operated under the oversight of a General Officer Steering Group comprised of the DCS/Distribution, DCS/Maintenance, DCS/Materiel Management, DCS/Communication-Computer Systems, the Commander of the Logistics Operations Center, and chaired by the DCS/Plans and Programs.

In June 1986, AFLC briefed AF/LE on the CLOUT program and highlighted the need to establish a similar cadre for the theaters of operation with a Theater-Depot Coordinator at the Air Staff. That ad hoc management arrangement (Fig 9) was approved during the September 1986 Worldwide Logistics Conference as a first step toward maturing CLOUT concepts and implementing the most promising initiatives within the Air Force.[20]

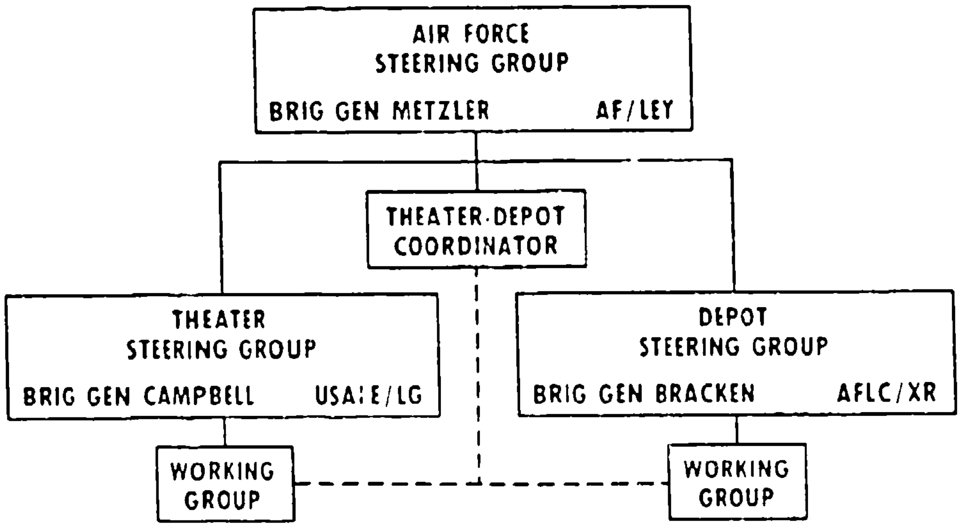

Fig 9. Air Force CLOUT Steering Group Structure.

Within that framework, the CLOUT Program Office developed an AFLC Action Plan that identified major command objectives, tasks, and actions required to implement the CLOUT concept within the Command. Distributed under the signature of the Chief of Staff in May 1987, this plan established corporate agreement on functional Offices of Primary Responsibility and milestones for developing, testing, and implementing changes to the depot elements of the logistics system. While the action plan cut across a wide

20 Air Staff and MAJCOM representatives on the Depot-Theater workgroups met at RAND in Santa Monica, California, in May 87 to define an Air Force game plan for implementing CLOUT. (11:9-15) This effort was later superceded by the AFLOGCON initiative.

array of functions, many of which are illustrated in Fig 10, the thrust of those changes focus on the Ogden Air Logistics Center's test of Distribution and Repair In Variable Environments (DRIVE).

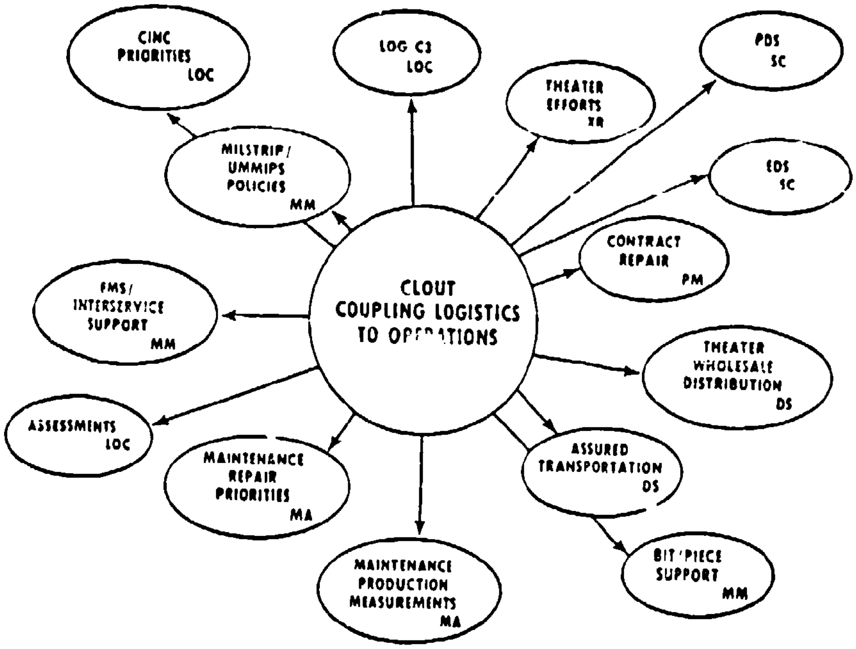

Fig 10. Major Areas and Functions Impacted by AFLC Action Plan.

Developed by RAND, this resource allocation model uses Dyna-METRIC-like techniques to prioritize distribution and repair actions for recoverable items based on current asset status and near-term aircraft availability goals at worldwide operating locations. Applied to selected F-16 A/B/C/D avionics items repaired at Ogden, DRIVE identifies on a bi-weekly basis the specific order in which items should be repaired by the depot and to which location serviceable assets should be shipped to achieve the highest aircraft availability possible per repair dollar invested. With DRIVE, AFLC Item Managers can allocate available resources to the highest priority needs of operational units and make effective adjustments in response to changing circumstances.

Recent shortfalls in Depot Equipment Purchased Maintenance (DPEM) funding have highlighted that AFLC does not have a means for allocating scarce resources in this fashion. The pressing need for such a capability has focused management attention on accelerating development and implementation of DRIVE. The WSMIS System Program Office's expertise and demonstrated success with Dyna-METRIC capability assessment models, such as RAM and SAM, place it in a unique position to make DRIVE a command-wide decision tool in the near future and to rapidly expand this capability to other vital logistics resources consistent with AFLOGCON. [21]

THEATER	ELEMENT	MAJCOM
EUCOM	Allied/Joint Support	USAFE
PACOM	Forward & Depot Support	PACAF
CENTCOM	Intra-Theater Transportation	TAC (9 AF)
SOUTHCOM	Mutual Support	TAC (12 AF)
NORAD	Mutual Support	TAC (1 AF)
LANTCOM	Mobility	TAC
JTF-ALASKA	Command & Control	AAC
WORLDWIDE	Inter-Theater Transportation	MAC
WORLDWIDE	Mobility	SAC
WORLDWIDE	Depot Support	AFLC

Fig 11. MAJCOM Responsibilities for Concept Development.

In conjunction with these AFLC actions to revise the depot support process, work is now underway within the Air Force strategic planning process to establish objectives for the nine basic elements of AFLOGCON and to define

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[21] A detailed description of the DRIVE algorithm and the procedures currently being tested at Ogden are provided in Reference 12. Why DRIVE is considered vastly superior to the traditional distribution and repair process, and what steps AFLC should take to capitalize on opportunities for accelerating DRIVE implementation are addressed in Reference 13.

logistics concepts of operations for each theater.[22] Fig 11 identifies the key players involved in this effort and their assigned areas of responsibility. (14:2-3)

What Is At Stake?

Without a doubt, AFLOGCON impacts all aspects of the Air Force logistics system. And that is what an overall concept of operations should do. Normally, however, a concept of operations is approved during the initial research and development (R&D) phases before significant resources are committed to system design, production, and operation. Since the Air Force logistics system already exists and has been in operation since 1947, the need for a logistics concept of operations now suggests two things.[22A] Either the logistics system as it presently exists has no concept of operations or its concept of operations fails to meet its intended purpose.

The Air Force logistics system has sustained US and Allied forces for more than forty years. While the effectiveness of that support may be debated, the fact remains that this could not have been done without an explicit or implicit concept of operations. The worldwide nature of the logistics system, the diversity of forces and missions supported, and the complex organizational structure that has evolved over the years to control the division of labor attest to this. Although difficult to measure, success in that context can range anywhere from "just managed to get by" (i.e., the system hasn't really been tested as might be suggested by the conflicts during this period) to "fully and effectively used available resources."

[22] In Jul 87, the AFLC Chief of Staff and the DCS/Plans and Programs were reassigned to Headquarters USAF as AF/LE and AF/LEX, respectively. These moves put key proponents of the concepts embodied in CLOUT in an ideal position to follow-up on AFLC efforts to institutionalize these concepts Air Force-wide.

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22A Although the Air Force was officially established by the National Security Act of 1947, the Army Air Forces was essentially treated as a separate service during the last two years of WWII. The logistical machinery of the Air Force actually traces its origin to the Army Air Corps' supply system of the early 1920s.

Given this "success," it's clear that AFLOGCON is a modification to the basic concept of operations that has governed the Air Force logistics system to date. As with hardware systems, the modification process must be clearly defined in terms of the changing need it is designed to meet or the new capabilities that have made it possible to make the system more responsive in carrying out its mission. From this perspective, the type and scope of change become important factors. Are we dealing with a minor Class I modification, a safety of flight restriction, or a Class V mission change? That question cannot be answered without a specific assessment of how well the existing system and its components function to meet its intended purpose. Deficiencies encountered during actual operations are, of course, the driving force behind such assessments and ultimately lead to decisions to modify or replace components of any system.

In the case of the Air Force logistics system, a number of major deficiencies have surfaced in recent years. Most of these have been recognized for some time as major impediments to logistics operations and action is ongoing at various management levels to resolve those problems. The advanced logistics management information systems the Air Force introduced into service in the 1950s and 1960s, for example, have been widely recognized as obsolete for some time and large scale modernization programs are underway to upgrade these systems using the latest available technology. Along the way, however, the Air Force also recognized that mere replacement of logistics management systems, on a one-for-one basis is not the ideal solution.

Proliferation of different hardware, software, and the resources required to operate and maintain these information systems was not only prohibitively expensive but also proved counterproductive by creating obstacles to greater functional integration within and among all elements of the

logistics system. Actions to control this process are now focusing on defining a conceptual solution to the problem and institutionalizing an overall automated data processing architecture that will allow more rapid and effective modernization as new and better technology becomes available.[23] Independent data bases with system-wide access by functional users offer great promise of eliminating or neutralizing the existing compartmentalization illustrated in Fig 12.

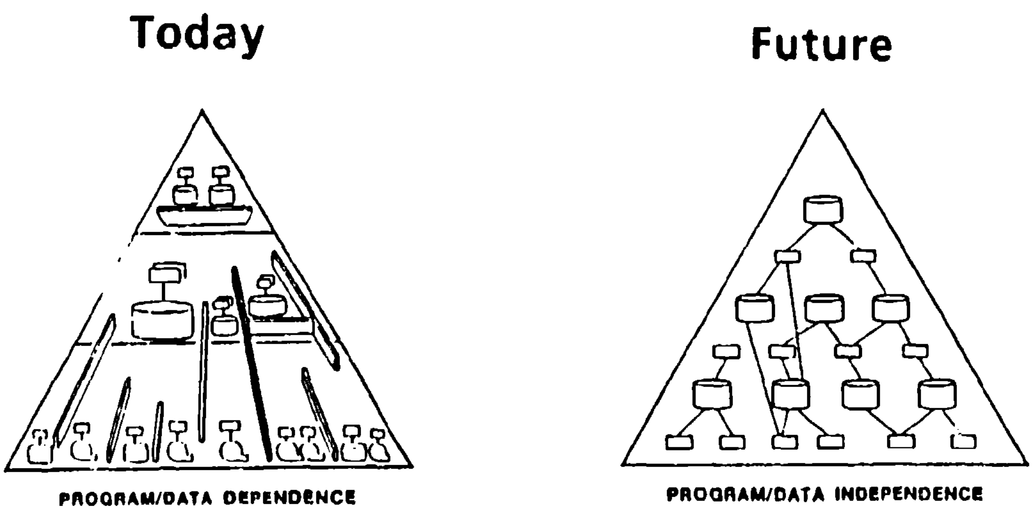

Fig 12. Potential Solution to Information System Segmentation.

Similar changes continue to be driven by the more complex weapon systems the Air Force has put on the flightline in recent years. The advanced technology and high performance of current generation aircraft, such as the F-15, F-16, and B-1, have significantly altered the logistics processes that keep these aircraft flying. While this infusion of new technology

[23] The Air Force has established a program office for the development of a Logistics Information Management Support System (LIMSS). More details on the logistics information systems architecture and a roadmap of future actions are contained in Reference 15, 16, and 17.

into Air Force weapon systems produced the expected state-of-the-art improvements in operational performance, it also created more sophisticated aircraft components that demand far more complex and expensive support equipment and highly skilled maintenance personnel, especially at the OIM level. This shift in complexity, coupled with the associated higher cost of the inventory in the supply system, has blurred the traditional distinctions between field and depot workload, and triggered a much greater need to coordinate and integrate support activities among and between all elements of the logistics system.[24] It also created a new focus on identifying more effective alternatives to the traditional three-level concept for off-aircraft maintenance.

The overwhelming diversity and growth in the technical complexity of weapon systems have significantly increased logistics support costs. The phenomenal rise in Operations and Maintenance budgets during the 1970s highlighted the problem and focused attention on its source. Since new technology is continually applied in developing newer generation weapon systems to keep pace with the threat, the traditional acquisition process was pinpointed as the culprit. New technology had indeed been incorporated into the latest weapon systems but without adequate thought and enough deliberate planning to avoid adverse impact on the logistics system.

In 1982, the Carlucci Initiatives[25] brought about major reform of the defense acquisition system to improve the process and to fix that problem. One of the most important steps taken under these initiatives was the

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[24] The level of complexity in the avionics world in particular has grown almost to the level associated with jet engine technology and comparable high intensity management (e.g., depot overhauls at JEIM facilities, serialized control and accounting, etc.) is being applied at the field and depot level to better manage these critical, high cost resources.

[25] Named after then Deputy Secretary of Defense Frank Carlucci, these initiatives paved the way for a much sharper look at weapon system reliability, maintainability, and availability during high level defense program reviews at major system acquisition milestones. Mr Carlucci became the Secretary of Defense in Dec 87.

formal recognition that weapon system supportability must be on an equal footing with the traditional program evaluation parameters of cost, performance, and schedule.

This management emphasis ignited a cultural change toward greater concern for reliability and maintainability (R&M) that has swept through the military services and the defense industry. As a result of that change, dramatic improvements in weapon system supportability have already been achieved under the Air Force's R&M 2000 program. Weapon System Master Plans have been developed to provide comprehensive profiles of current and planned actions to improve system supportability, Blue Two visits familiarize weapon designers with flightline support problems, and many other initiatives now focus on applying the latest technology in innovative ways to improve the total spectrum of logistics support operations.

Problems of this nature have been handled as separate management issues in the past without fully examining and relating these efforts to the logistics system as a whole.[26] AFLOGCON fills this void by providing an overarching logistics concept of operations that clearly specifies the required characteristics of the logistics system and critical relationships between its many diverse components. In addition to the traditional maintenance supply, and transportation functions, components or subsystems of the logistics system include such processes as weapon system acquisition, C2, communication, engineering services, security, and medical support. The functional synchronization and scope of this effort is

[26] This fragmentation of management emphasis is reflected in the long range strategic planning process introduced within the Air Force in the early 1980s. The Long Range Logistics Planning Guide recognizes that the overall objective of logistics is to create and sustain combat capability. Although seven broad objectives have been established as cornerstones for strategic planning, this collection of objectives is provided without the linkage required to effectively manage and systematically integrate each objective with the overall goal of the logistics system. (18:7-8)

illustrated in Fig 13 from an information systems perspective.[27] Under AFLOGCON, these essential parts of the logistics system can be directly and indirectly related to each other and managed collectively based on their specific contribution to actual combat capability in the field.

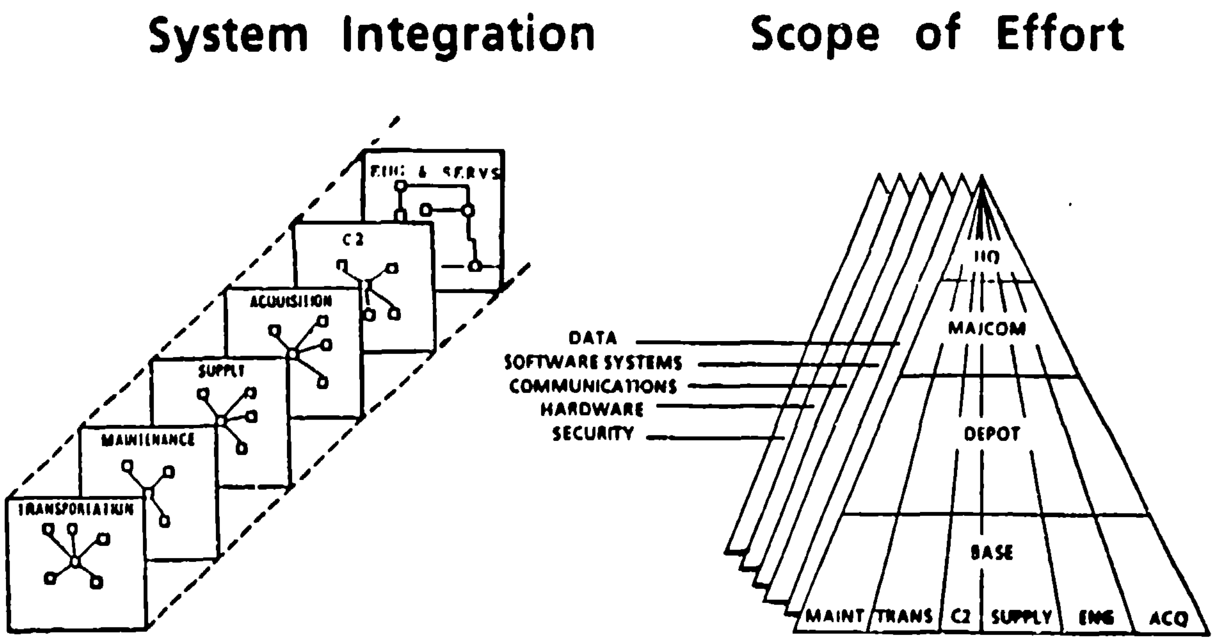

Fig 13. Functional and System Integration Requirements.

Evolutionary in nature, AFLOGCON can significantly improve existing and future logistics capabilities through better use of available technology, information systems, organizations, people, and other support resources. Under any operating conditions, AFLOGCON will provide specific direction to systematic development and use of management tools that are capable of rapidly matching critical resources at all levels of the logistics system against the highest priority, near-term needs of combat units worldwide.

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[27] The basic diagrams were adapted from a briefing given by the AF/LEY Systems Integration Office to the Logistics C2 Tiger Team in Sep 87. More detail on this and related Air Force initiatives are provided in Reference 15.

The structural changes that must be made to implement AFLOGCON range from Class I to Class V modifications depending on which component of the logistics system is under examination.[27A]

ELEMENT	REQUIRED CHANGE	CLASS MOD
Command & Control System	Real Time Weapon System Support Assessment & Resource Allocation	IV
Priority System	Transition From Static FADs/UNDs To Time & Weapon Sensitivity	V
Transportation System	Adjust Non-Unit Cargo Movement Requirements	II
Communication System	Convert to Hard, Survivable, Compatible ADP Equipment & Data Links	III
Distribution System	Shift From Vertical to Horizontal Emphasis; Pull To Potential Push Capability	I
Base Maintenance System	Reorient From Unit to Regional Repair Via Mutual Support	IV
Depot Maintenance System	Workload Shops Against Near-term Weapon System Needs Vice Quarterly Goals	III

Fig 14. AFLOGCON Assessment of Selected Logistics System Components.

A subjective assessment of these classifications is provided in Fig 14 to illustrate that a definitized logistics concept of operations is required and can readily be used to identify the need for system changes, establish their relative priority to overall system performance, and uniformly guide management actions throughout the entire logistics system.

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[27A] AFR 57-4 establishes five major modification categories: Class I (temporary modification for special missions), Class II (temporary modification for test and development), Class III (permanent correction of production deficiencies), Class IV (Class IVA--permanent correction for safety; Class IVB--materiel deficiency and R&M improvements), and Class V (adds new operational capability). The classifications assigned in Fig 14 reflect the relative degree of change required to key elements of the logistics system and the order of importance associated with each change; no distinction between temporary and permanent changes is intended.

Where Are We Now?

The combined effort of RAND and AFLC has put the Air Force in position to establish a mechanism for institutionalizing AFLOGCON Air Force-wide. Senior logisticians have approved a generalized statement of the need and directed that more definitive concepts be developed for the nine primary elements of AFLOGCON. At the same time, parallel efforts have been focused on establishing a concept of operations for logistics C2 and logistics concepts of operations tailored to each theater of operation. Specific responsibilities for developing this hierarchy of operating concepts have been levied on the MAJCOM and Air Staff strategic planning community. Through the semiannual FUTURE LOOK/Logistics Conferences, progress toward institutionalizing AFLOGCON within the strategic planning process now comes under periodic review of senior Air Force logisticians.

Although there are positive signs that the significance of AFLOGCON has been recognized, the scope and complexity of the task along with the political risks associated with major structural changes to the logistics system could de-rail or sidetrack the forward momentum achieved so far. This possibility is more likely to occur if difficulty is encountered in defining a practical way to achieve implementation of AFLOGCON. The controversies that have surrounded CLOUT initiatives provide ample evidence that concept definitization can create significant friction and resistance to change if not handled properly. A delicate balance between the traditional logistics processes and the introduction of new logistics technology must be struck to achieve the near and long-term stability that AFLOGCON can bring by fully integrating management improvement actions across all elements of the logistics system. In that sense, AFLOGCON is still in the gestation phase and will continue to be on trial for some time.

Actions in 1988, however, could hinder or speed the birth of AFLOGCON as a formal means for controlling the future direction of key facets of the Air Force logistics system. How well the concept elements and theater concepts of operations are defined will determine how effectively AFLOGCON is implemented within the Air Force. In conjunction with RAND, AFLC efforts to bring about this change have provided invaluable experience in selling the concept; developing and refining an overall AFLOGCON blueprint for action; identifying and prototype testing the new logistics technology that will be required for full implementation of AFLOGCON; and establishing an organizational framework that provides an effective nucleus for expanding the concept to all depot operations.

AFLOGCON is presently at a critical turning point as it transitions from a series of loosely connected joint MAJCOM/Air Staff initiatives to a formally approved Air Force process through which combat support doctrine is translated into specific operating concepts that will govern all future logistics programming, budgeting, and execution actions.

When Can It Be Done?

Full implementation of AFLOGCON across all elements of the Air Force logistics system should be achievable by the year 2010. Obviously, that timetable will be impacted by the degree of corporate commitment placed on the program, how effectively the program is structured within the Air Force, and the rate of technological advances that take place during the intervening years. A look at the emerging technology currently under development for AFLOGCON suggests a rapid rate of growth that may make it feasible to field a full operational capability much earlier than 2010. The Air Force has begun to transition from the traditional "linear" requirements techniques--that can, with considerable time and effort, be

replicated manually by the Item Manager--to the much more complex "non-linear" marginal analysis techniques that are beyond human computation capabilities. These advanced techniques are presently applied to the full range of Air Force managed items using more and more sophisticated objective functions. This shift toward more advanced computation techniques is rapidly converting requirements and capability assessment models from an item and system backorder/fill rate-oriented requirements process to a full-up weapon system availability goal-oriented capability that is sensitive to a component's indenture relationships to primary end items, specific operating locations, and critical near-term planning horizons. The changes experienced along these lines over the past decade are illustrated in Fig 15 to highlight the progress made and the lack of uniformity across different types of items and requirements categories.

TYPE ITEM/RQMT/DSD		MARGINAL ANALYSIS TECHNIQUE BACKORDER/FILL RATE		ACFT AVAIL GOAL
EXPENSE				
POS	D062	YES	··· POTENTIAL - -→	NO
WRSK/BLSS	D029	NO	··· POTENTIAL - -→	NO
OWRM	D062	NO	··· NOT PLND - -→	NO
INVESTMENT				
POS	D041	YES	— ACTUAL ——→	YES
	D028	YES	··· POTENTIAL - -→	NO
WRSK/BLSS	D029	YES	— UNDER DEV —→	NO
OWRM	D041	NO	··· NOT PLND - -→	NO

Fig 15. Use of Advanced Marginal Analysis Techniques.[27B]

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27B Yes or no in the left and right-hand columns of this table indicates whether the capability exists today. The arrows show status in terms of actual, planned, or potential use of aircraft availability goals for each category. Dynamic Research Corporation (DRC) is in the process of developing WSMIS REALM (Requirements/Execution Availability Logistics Module) for WRSK/BLSS. An intermediate process, WSMIS REALM will compute the prepositioned requirement using D029 input, compute aircraft availability-oriented requirements, and feed the results to D041. The F-15, F-16, and F-111 WRSK/BLSS will be computed in this manner for the 31 Mar 88 D041 computation cycle.

The DRIVE model currently under development at the Ogden Air Logistics Center extends technology further in this direction by relating immediate distribution and repair actions to weapon system availability goals at specific wordwide locations.[28] This capability builds on the WSMIS/Dyna-METRIC assessments routinely used today by the MAJCOMs in determining C-ratings for prepositioned stocks at the unit level. While the initial focus of AFLOGCON at the depot-level is on investment spares, the ability to effectively extend these complex relationships to other commodities, such as fuels, munitions, and support equipment, will be gained in the process. Other advanced modeling techniques for managing the broader range of resources required to successfully operate from fixed operating locations have been under development for some time by various Air Force agencies.[29] If those efforts and related modeling/simulation initiatives are properly integrated and focused on AFLOGCON objectives, full implementation of a dynamic and comprehensive resource balancing mechanism should be possible within the next decade. Better use of available technology, information systems, policies, and procedures in conjunction with the development of new capabilities required to fully implement AFLOGCON is expected to yield the growth curve shown in Fig 16.

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[28] The D041 System currently computes a Variable Safety Level (VSL) based on a marginal analysis of system-oriented backorder/fill rates. An Aircraft Availability Model (AAM) that optimizes item buy and repair action against availability goals for the total fleet of a particular mission, design, or series of aircraft has been run parallel with D041 over the past two years but has not as yet replaced the traditional D041 computation.

[29] One such effort is the Expected-value-based Logistics Capability Assessment Model (ELCAM). An in-depth view of ELCAM and its relationship to current state-of-the-art modeling techniques, such as the Logistics Composite Model (LCOM), Theater Simulation of Airbase Resources (TSAR and TSARINA), and Dyna-METRIC is provided in Reference 19.

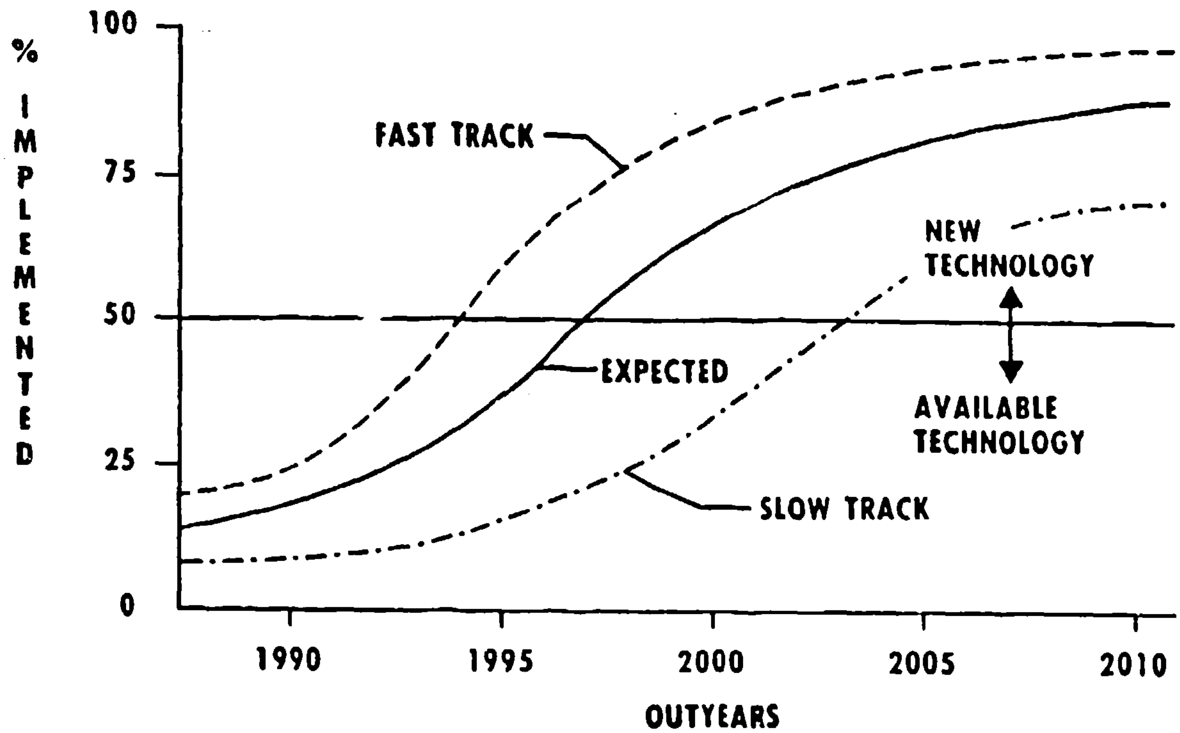

Fig 16. AFLOGCON Implementation/Technology Utilization Timetable.

Why Make The Effort?

The Air Force logistics system is an essential element of the overall force structure the United States relies upon to meet national security objectives. Its direct contribution to the readiness and sustainability of combat forces determines the degree of military power our nation can bring to bear to deter war. In the event that deterrence fails, the logistics system provides the staying power needed to successfully wage war on a global and regional basis under any and all conditions. How well the logistics system is structured to achieve these objectives will determine the actual war fighting capability we can extract from the weapon sytems we have fielded for this purpose and those we plan to put into operation in the future.

AFLOGCON focuses management attention on the overall concept of operations that governs the Air Force logistics system and its component parts. Through that process, corporate visibility and management actions at all levels of the Air Force can be more effectively directed toward the task of assuring that every logistics element is in complete harmony with the goals and missions established for the overall logistics system. Without an explicit expression of the logistics system's concept of operations, the effectiveness and productivity of the overall system, and in turn our war fighting capability, will not equal or exceed the potential sum that its component parts could generate. AFLOGCON provides an overarching concept of operations that responds to the constantly changing state of the logistics system and the external environment in which it must function. Moreover, once established, the concept can be adjusted in the future as the need arises. Such adjustments will be the basis for redirecting and applying available resources to the highest priority actions required to effectively implement the revised logistics structure. In this context, future changes would be processed from the top down and translated into action at all levels of the logistics system through the same control mechanism that is now being put in place to implement AFLOGCON.

Failure to capitalize on AFLOGCON would essentially maintain the status quo under which current fragmentation of effort, major system deficiencies, and ineffective system integration could continue to flourish. The chance of that happening, however, is extremely remote in light of the growing technological advances experienced in all logistics fields. More likely than not, failure to vigorously pursue AFLOGCON would only slow the application of new technology to improved system integration and postpone optimum system-wide resource utilization.[30] This "slow track" is illustrated in Fig 16.

[30] AFLC's unsuccessful efforts to modernize its logistics management systems in the mid-70s is a case in point. The technology required to

Such a turn of events is consistent with the historical growth of technology and its impact on society as a whole. This evolution--across the Stone Age, the Agrarian Age, the Industrial Revolution, and today's Information Age--has produced newer and more powerful generations of weapon systems. These systems, in turn, have created the need for a more complex logistics support system. That need can only be met through the application of new technology to all facets of the logistics structure. During the 20th century alone, global communications networks, high speed computers, and long-range airlift have made it possible to close overseas depots and sharply reduce pipeline investments while continuing to maintain Air Force operations worldwide. All of this was accomplished despite a growing scarcity of resources. These changes have produced a logistics system that features highly centralized logistics operations at both the depot and base level. The increased reliance on centralized support activities and the greater complexity of today's weapon support process have, however, made the logistics system more vulnerable and less flexible to respond to the much higher threat the latest generation of weapons pose to fixed operating locations.[31] AFLOGCON will focus available and

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[30] (Con't) implement the Advanced Logistics System (ALS) was not available at the time. Unilateral attempts to upgrade these systems failed to effectively draw on the expertise and resources available within the Air Force to deal with this need. The lack of system-wide planning resulted in congressional intervention and extensive delays before AFLC's LMS modernization program was finally approved in the early 80s.

[31] Wholesale support for worldwide Air Force operations has primarily been controlled by AFLC's five Air Logistics Centers in CONUS since 1963. Consolidation of Item and System Manager functions as well as depot repair workload to a designated Technology Repair Center (TRC) was carried out in the mid-70s to achieve additional economies of scale. Similar consolidations of base maintenance and supply functions were introduced to achieve more effective use of resources. In recent years, however, depot and base functions have become more decentralized to reduce vulnerability and respond more effectively to theater and flightline needs. The establishment of depot Support Centers and distribution systems in Europe and the Pacific (SCE/EDS, SCP/PDS), the disestablishment of the Pacific Logistics Support Center (PLSC), and the shift to combat-oriented maintenance and supply operations (COMO/COSO) are examples of this trend. A detailed discussion of this trend and its impact on AFLC's mission assignment process is provided in Reference 20.

emerging technology on the management tools the Air Force needs to effectively deal with this dilemma. It will also provide an overarching logistics concept of operations that will guide related system, policy, and procedural changes required for this purpose.

How Should We Proceed?

The structural changes envisioned under AFLOGCON impact all aspects of the Air Force logistics system--some more than others. To effectively make such changes requires the full and enthusiastic support of the entire logistics workforce--from senior logisticians, mid-level managers, and first-line supervisors to the people who actually carry out day-to-day support operations.

The first step toward that goal is to clearly define the basic Air Force logistics concept of operations in unambiguous terms that are easily understood at all levels of management. Although that sounds easy, AFLC's experience in selling the CLOUT concept--the precursor of AFLOGCON--identified a number of obstacles that make this task extremely difficult. Finding a common denominator, in terms of ideas, symbols, and words, that cuts across each individual's view of the logistics system is a tough job. Most functional specialists, first and second level supervisors, and even senior managers have a relatively narrow base of expertise generally limited to one or two of the many basic logistics functions that are an integral part of the entire logistics system. Moreover, how each individual perceives broad concepts and detailed mechanics that stretch across the full logistics spectrum is a function of the unique knowledge, experience, and attitudes about logistics that have been formed up to the present. The degree of success or failure encountered by the individual, for example, greatly influences whether new concepts and dramatic changes

are received with optimism or pessimism. The same is true, of course, if the proposed change is perceived to enhance or threaten one's job, career, or other valued aspects of life. Even if such factors were not at play, resistance to change is built in.[31A] We tend to be comfortable with the known and expected; uncomfortable with the unknown and unexpected. It takes much more effort and risk to take on the latter challenge and, in almost all cases, the potential benefits to be derived must outweigh the costs before positive action is taken.

With this in mind, the subtle and not so subtle changes that have been made to get the new concept accepted take on greater significance. RAND's catchy terms and acronyms for this initiative--Project Uncertainty, CLOUT, and DRIVE--do a great job of conveying the crux of the problem and the solution. Everyone can identify with wartime uncertainties but we tend to assume away the realities our systems, policies, and procedures must deal with under combat conditions. Why? Because we don't know how to effectively deal with such complexities in a structured, deliberative planning environment. So what's new? Well, it shouldn't be a total surprise but peacetime demands at specific operating locations and even at the depot level fluctuate so much that we can't predict with reasonable accuracy what we'll specifically need and where it will be needed. If this is true as indicated in Fig 1, it makes the warfighting task a lot tougher than we thought. RAND's proposed solution is simple to understand on the surface--Couple Logistics to Operations to meet Uncertainty and the Threat (CLOUT) and Distribute and Repair In Variable Environments (DRIVE). Aren't we doing that already? If not, what should we do?

RAND's attempt to answer these two questions is illustrated in Fig 5. The complexity of the relationships shown here and the use of "black box" decision tools to deal with the real world make it extremely difficult to

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31A General James P. Mullins, former AFLC Commander, attributed many of today's logistics problems and those of society's in general to man's inherent tendency to cling to outdated mind-sets. In his view, "mind-sets are internalized patterns of human perception--ways developed as a result of experience, education, and maturation within a particular group" that can prevent us from effectively dealing with change if they are inconsistent with the realities of our environment. (44:46)

understand the proposed solution. More importantly, a giant "leap in faith" is required before such a solution is accepted as feasible by the average person. Fig 6 illustrates AFLC's initial cut at making the concept simpler to understand. Visual images of the depot and theater processes and direct point-to-point relationships between basic components of the logistics system have proven to be a much better vehicle for successfully conveying the proposed concept to a large cross section of the logistics workforce. Questions and doubts raised on the DRIVE/DRIVE-like decision tools ("black boxes") proposed for depot and theater resource allocation have been effectively addressed by pointing out that such a weapon system availability driven allocation model is being used with very promising results at the Ogden Air Logistics Center.

The fact that this critical element of the concept is no longer just theory but is being applied in actual practice to depot distribution and repair decisions for more than 300 F-16 avionics items is extremely important. Without such demonstrated evidence of practical value, new and complex technological applications are invariably rejected. The reason for this is quite simple when put in the right perspective.

Over the past 50 years, we have experienced tremendous technological growth that has altered our very existence. The automobile, airplane, television, radar, and nuclear energy are among the many products this technological explosion has made a routine part of everyday life. Although each of us is incapable of mastering this wide, diverse array of technology, we routinely rely on these products after their value has been demonstrated through actual use. Initially, this process involves trial and error. But gradually over time, confidence is built and greater dependency on the new technology becomes the norm. [32]

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[32] Through this process, we have created and widely applied the tools (cars, planes, computers, etc.) that presently make us more flexible and

A key element of this process is the assumptions we make about the more technically complex products we use. We don't need to know how to build a watch to tell time; but, we do have to have a working knowledge along those lines or access to someone who does when the watch is critical to our operations, prone to fail, and no replacement spare is readily available. In the most extreme case, given today's high reliability, a spare watch would normally solve the support problem. More often than not, an operator just reads the time and relies on others to fix the watch when it breaks. The same is true for every logistics specialist. In our own field of expertise, we know what it takes to "read" the watch; in related support functions we turn to the appropriate specialist or specialists when problems beyond our capabilities are encountered.

The point here is that no matter how complex the new technology is, the logistics workforce will accept and use it if it can be demonstrated convincingly that the job can be done easier, better, or at less cost. It's also clear that if a state-of-the-art improvement is involved, those who will benefit from it will have a greater tendency to minimize and assume away problems that stand in the way of implementation. The reverse, of course, is true for those who will not benefit or stand to lose if the change is made. In this context, the images of assured C2, assured inter and intra-theater transportation, and centralized theater distribution and repair activities conveyed in Fig 6 triggered some unexpected and highly

[32] (Con't) responsive to a wide variety of needs. The operational performance of existing weapon systems has similarly increased in terms of time, distance, and destructive power. This growth has driven greater technical complexity, a need for higher specialization of skills, and increased reliance on the intermediate/depot support functions we turn to when operational support problems arise. If such support is critical to continued operations and unavailable when and where it is needed in a timely fashion, the utility of high technology becomes questionable and we tend to shy away from its products. This paper also addresses other reasons for leaving available technology with a high potential for improving combat capability on the "shelf."

emotional resistance to the proposed CLOUT concept. A reassessment based on that reaction produced the more acceptable and less threatening illustration of the concept in Fig 8. This evidence of resistance to change proved to be constructive in that it led to greater insight into how the concept was perceived, the barriers that stand in the way of its acceptance, and an improved architectural framework for institutionalizing the concept within the Air Force.[33] Similar refinements of the concept will surely be made as we gain greater knowledge of what's involved. AFLC should build on this foundation to implement AFLOGCON and nurture the innovative thinking required for future improvements of this nature.

The second step toward achieving these structural changes is to convince top management at all levels of the Air Force and DOD that every major decision must be examined from this perspective. If the concept of operations is to govern the entire logistics system, the decision-making process at the depot, in the theater, at the Air Staff, and at all other levels must be modified to assure that all decisions are consistent with AFLOGCON. Explicit relationships between the concept and the full range of logistics functions must be established for this purpose to guide corporate decision-makers. Direct operations support functions and indirect functions, such as weapon system acquisition and accounting and finance, must be included within that framework consistent with their impact on the current and planned force structure supported by the logistics system.[34]

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[33] As indicated in Footnote 31, the key here is to ensure sufficient centralized control exists to effectively carry out decentralized execution at the unit level. Col Don Hamilton briefed the restructured CLOUT program to the AFLC Commander in Aug 87. In approving the program, Gen Hansen emphasized that AFLC will take a leadership role on Air Force logistics but must work in harmony with the Air Staff and the MAJCOMs toward improved C2, weapon priorities, and other key Air Force-wide logistics functions. More details on Gen Hansen's views on CLOUT are provided in Reference 21.

[34] The Air Force today has separate commands for RDT&E and logistics support. In recent years, however, organizational changes have built a "bridge" between AFSC and AFLC in recognition that this artificial

The third and final step toward achieving the goals of AFLOGCON as soon as possible requires the establishment of system-wide incentives to accelerate change action. The most talented people should be applied to this task from both a managerial and technical standpoint. Performance standards must be revised at all levels of the system if found to be inconsistent with AFLOGCON. Organizational changes that facilitate horizontal and vertical integration of critical logistics functions will also be required. Many changes along these lines have already been made or recognized as needed to deal more effectively with the growing cost and complexity of today's logistics requirements. Similar changes to management systems, policies, and procedures must also be controlled through improved system integration and periodic performance evaluations that focus on actual operating results in the field. [35]

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[34] (Con't) segmentation can be counterproductive to creating and sustaining warfighting capability. Within the Army and Navy, the Army Materiel Command (AMC) and the Naval Materiel Command (NMC) combine acquisition and support functions under a single command. The Air Force logistics system must effectively integrate AFSC and AFLC actions, as well as the logistics functions assigned to other MAJCOMs and Separate Operating Activities (SOAs), under AFLOGCON.

[35] More realistic exercises, such as SALTY DEMO and CORONET WARRIOR, should be conducted to verify that improvements to combat support are, in fact, taking place through better use of available and emerging technology. When such improvements fail to materialize as expected, corrective action must be taken to pinpoint the cause of the problem, determine the best solution, and modify the process as quickly as possible.

PART III. GAMEPLAN FOR FUTURE ACTION

Objectives

The strategic planning objectives of the Air Force are in the process of being realigned under the logistics elements of AFLOGCON. Although this action is consistent with the nature of a system-wide logistics concept of operations, AFLC has gone on record that "the major elements of the concept, while integral to the basic concept, fall short of addressing the full spectrum of strategic issues which must be addressed by all major commands." Instead of targeting on this dilemma by adding to or modifying the existing logistics concept elements to clarify and link these issues directly to AFLOGCON, AFLC recommended that the Logistics Concept of Operations be separated from the Air Staff's strategic objectives and used in the same manner as DOD long-range guidance, new technologies, and environmental assessments to "directly influence the strategic planning process." (22:1) Under AFLC's proposal, AFLOGCON would "permeate the USAF strategic planning process to the extent that it might even drive specific goals or objectives." It was pointed out, however, that the wartime focus of the concept should not drive a narrow approach to strategic planning, limit the Service's long-range focus, or reduce the effectiveness of the process.

Illustrated in Fig 17, this proposed approach to AFLOGCON fails to recognize that every logistics issue should be addressed and resolved on the basis of its impact on the logistics system as a whole. The existing partitioning of effort within the Air Force both along functional and organizational lines makes it absolutely essential that AFLOGCON be broadened to cover these logistics areas rather than to exclude these through conscious action. The interrelationships between strategic issues and the concept of operations must be clearly defined to better understand the nature of these issues and their impact on combat capability provided

by the logistics system. Such linkages will give logisticians at all levels of the Air Force a means to optimize resources through actions that are balanced and consistent across all logistics elements. To do that, the past, present, and future state of the logistics system must be fully understood in terms of an overarching logistics concept of operations.

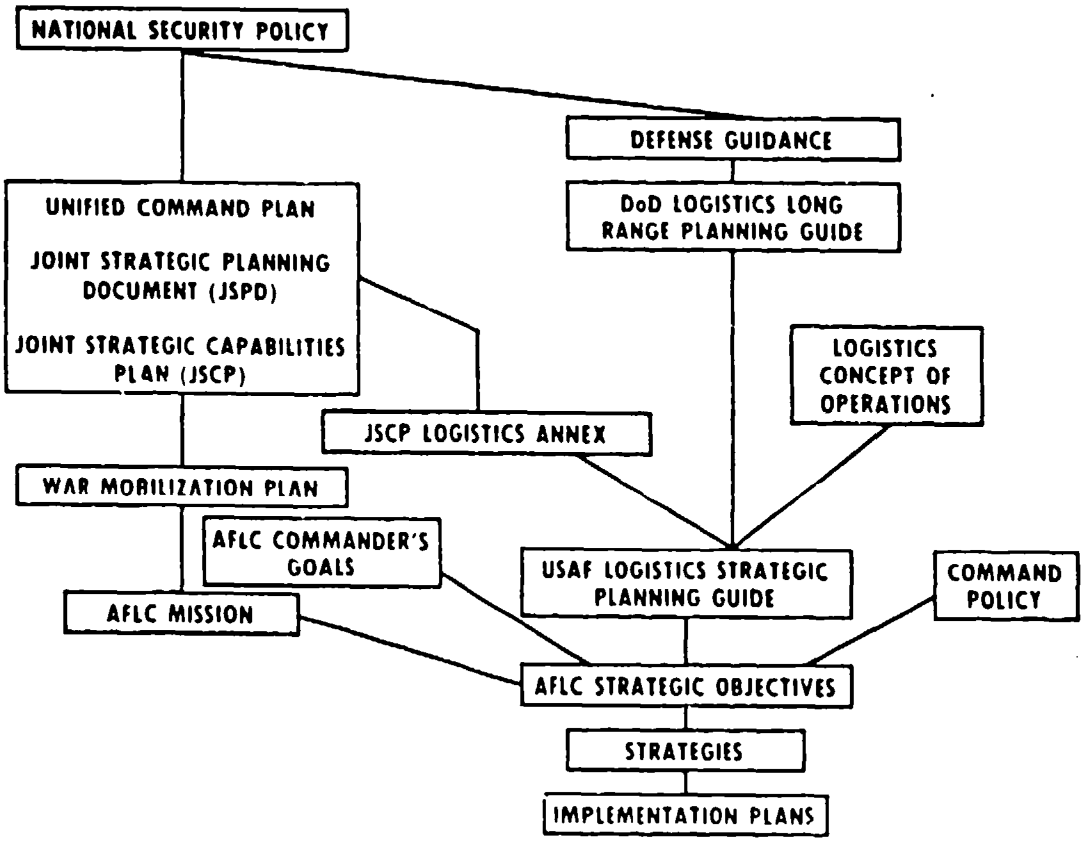

Fig 17. Planned Relationships Between AFLOGCON and Strategic Planning.

Ironically, such an all-encompassing concept of operations is exactly what AFLC needs to complement its recent initiative to better integrate the Command's strategic planning process with higher headquarters direction and subordinate level planning. Directed by the AFLC Commander in August 1987, this initiative also seeks to revitalize and institutionalize an annual strategic planning process that effectively translates critical corporate

planning actions (e.g., new technology, weapons system management improvements, and better production techniques) into specific infrastructure requirements and approved programs. Past efforts in this arena had evolved from an overly detailed and bureaucratic strategic objectives plan in the early 1980's to the six strategic objectives shown in Fig 18.

- **PREPARE AFLC TO MAINTAIN MODULAR ELECTRONICS HARDWARE & SOFTWARE BY 1990**
- **PREPARE AFLC'S PROCESSES FOR MODULAR ELECTRONICS BY 1990**
- **PREPARE AFLC TO SUPPORT ADVANCED MATERIALS & STRUCTURES BY 1992**
- **PREPARE AFLC TO USE DIGITAL DATA FROM CRADLE-TO-GRAVE BY 1990**
- **PREPARE AFLC'S WORKFORCE TO DEAL WITH EMERGING CHALLENGES BY 1995**
- **RESTRUCTURE AFLC'S ORGANIZATION TO EXPLOIT INFORMATION TECHNOLOGY BY 1998**

Fig 18. AFLC Strategic Objectives (FY87). (23:5)

Too narrow and focused, these objectives are in the process of being replaced by the more far reaching and broader objectives shown in Fig 19. More consistent with Air Staff and DOD planning guidance, the new objectives also provide a direct tie to the Commander's five goals which emphasize the importance of AFLC's people, supply combat capability to the using commands, quality, accountability, and effective program execution. (24:1-7)

- FOCUS THE LOGISTICS INFRASTRUCTURE ON INCREASING COMBAT CAPABILITY
- ENSURE THAT THE LOGISTICS CAPABILITIES ARE IN PLACE TO SUPPORT DEPLOYMENT, EMPLOYMENT, AND SUSTAINABILITY OF COMBAT FORCES IN THE FULL RANGE OF WAR SCENARIOS
- INTEGRATE THE DEVELOPMENT/MANAGEMENT OF AIR FORCE LOGISTICS STUDIES, PROCESSES, POLICIES, AND PRIORITIES
- EMPHASIZE LOGISTICS CONSIDERATIONS IN ALL ACQUISITION PROGRAMS INCLUDING MODIFICATION, REPAIR, AND REPLACEMENT
- MAINTAIN A WORKFORCE CAPABLE OF PROVIDING RESPONSIVE, EFFECTIVE, AND QUALITY LOGISTICS SUPPORT IN WAR AND PEACE
- MAINTAIN A READY INDUSTRIAL BASE CAPABILITY
- INTEGRATE ADVANCED TECHNOLOGIES INTO LOGISTICS APPLICATIONS
- MAXIMIZE THE DEFENSIVE CAPABILITY OF ALLIED AND FRIENDLY NATIONS TO MEET MUTUAL SECURITY OBJECTIVES

Fig 19. Proposed AFLC Strategic Objectives (FY88). (23:23)

Changes to the AFLC Board Structure were also approved to establish a better mechanism to control this process. The Advanced Planning Group which had exercised oversight of strategic planning up to this time was replaced by a Planning And Requirements Committee (PARC) in December 1987 [36]. This committee was charged with the responsibility of integrating all functional planning within the Command and ensuring that approved plans are effectively translated into specific infrastructure requirements and incorporated into the programming process. Existing planning data bases, such as approved Statements of Need (SON), Program Management Directives (PMD), mission assignments, and Weapon System Master Plans (WSMP) will be

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[36] Chaired by the Director of Plans (XPX), the PARC is supported by two subpanels. The Planning Integration Panel (PIP) identifies the need for new plans, review strategic planning guidance, and ensures compliance; the Requirements Integration Panel (RIP) ensures infrastructure requirements are integrated across all functions, support AFLC plans, and are included in the Program Objective Memoranda (POM) and budget process.

integrated through available data base management techniques to facilitate centralized planning and control over functional integration requirements in support of PARC decision-making.

The establishment of the PARC mechanism is without a doubt a step in the right direction. However, a look at Fig 19 confirms that AFLC will continue to operate under a loosely defined set of strategic objectives without a meaningful frame of reference. Yet each of the proposed strategic objectives can be related either directly or indirectly to the Air Force logistics system and its overall goal of creating and sustaining combat capability. AFLOGCON can provide such a sorely needed and all-inclusive framework of reference to guide system-wide decision-making across all phases of strategic planning, programming, and execution.

One step toward institutionalizing AFLOGCON has already been taken within AFLC. The AFLC CLOUT Action Plan established a comprehensive set of objectives for implementing the CLOUT concept within the Command. Approved by the primary DCSs, this plan identifies the tasks that must be accomplished to make depot operations responsive to the dynamic immediate needs of combat units. The CLOUT Program Office has worked within that frame of reference to implement the concept within the Air Force. Since CLOUT initiatives are consistent with AFLOGCON, a solid foundation now exists to further define, test, and apply the new logistics concept of operations within AFLC and the Air Force.

Strategy

A strategy for accomplishing this as effectively as possible within the resource constraints we can expect to encounter in the future demands that we take advantage of the positive actions AFLC has undertaken so far.

The recognition that CLOUT initiatives provide a baseline from which all facets of AFLOGCON can be addressed is vital to that effort. The difficulty experienced in attempts to sort and fit the existing strategic objectives and their related programs within the nine logistics elements of AFLOGCON underscores the need to expand and refine the basic concept for the Air Force logistics system. The "wiring diagrams" shown in Fig 4 and Fig 8 provide an all-encompassing framework of reference to guide this effort. Major Air Force functions and organizations not directly identified in these illustrations (e.g., basic research, weapon acquisition, accounting and finance, security assistance, etc.) must be linked to the concept of operations by identifying their contribution to the creation and maintenance of the Air Force force structure. In considering the direct and indirect relationships of these functions to the overall concept of operations, it becomes evident that two basic categories must be dealt with.

The first--and most visible--category is the operational force structure we normally associate with combat operations at the base or unit level. Illustrated on the left side of Fig 20, direct force structure elements include the primary aircraft authorized (PAA), the missiles, munitions, chaff and flares, and other essential hardware that constitutes the weaponry our forces use to wage war. Included in this category are all of the essential ground support and base operating resources the unit must have to effectively carry out its mission.[37] The combat capability these resources provide at a given time can be measured quantitatively in terms

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[37] Direct combat support resources in this sense cover the full range of facilities, equipment, materiel, and supplies that are critical to unit operations. Flightline vehicles (e.g., fuel trucks, start carts, tow tugs, MJ-1 bomblifts, fire engines, etc.), pre and post-flight equipment, AIS and other shop maintenance tools, PRIME BEEF rapid runway repair equipment, and general purpose vehicles for perimeter control are among the many resources that can significantly limit or curtail quick turn sorties and sustained high intensity base operations.

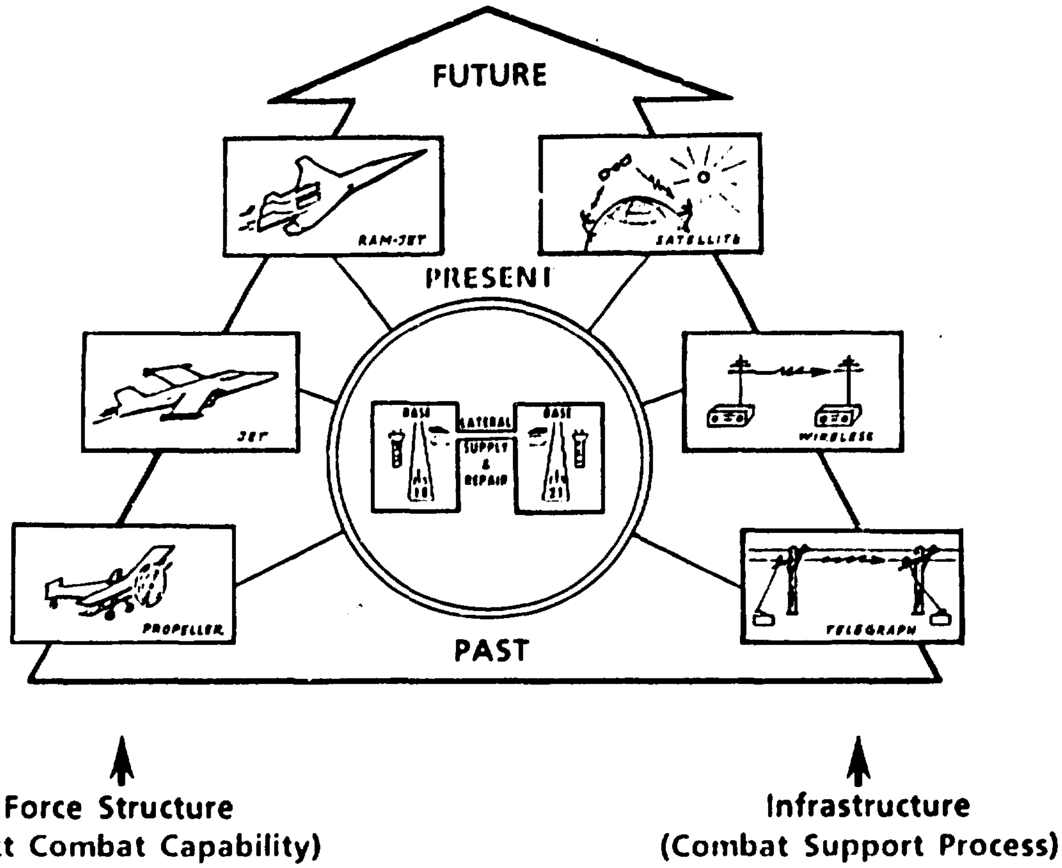

Fig 20. Force and Infrastructure Relationships - AFLOGCON. [38]

of total wartime requirements and available assets on hand ready for use. Unit C-ratings and Status Of Resources and Training System (SORTS) assessments address the most critical of these supplies, equipment, skills, and the degree of proficiency base personnel have achieved toward the

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[38] The technological changes illustrated here for the infrastructure focus on the worldwide communication network that exists today. The evolution of marginal analysis techniques and their application to the requirements and distribution systems shown in Fig 15 provide another example of how technology is impacting critical infrastructure support functions.

required capability.[39] Deficits in any of these areas should be attacked selectively with high priority placed on those deficiencies that lower overall combat capability the most.

The second--and less visible--category is the infrastructure that supports and maintains direct combat operations. Illustrated on the right side of Fig 20, infrastructure requirements have traditionally been viewed as the physical facilities from which we operate at the base and depot. While that view remains largely valid, AFLOGCON's focus on base/unit level operations introduces some subtle yet powerful distinctions. From this perspective, the physical facilities and on-base resources must be viewed as a part of the direct force structure. As we move further and further away from the site of unit operations and look at the region, theater, or depot, these support resources become a tangible part of the infrastructure defined by AFLOGCON. This distinction enables decision-makers at all levels to discriminate between competing programs and to establish a priority structure that places higher value on those program, processes, and resource requirements that make a more immediate and direct impact on operational effectiveness at the unit level.

Under AFLOGCON, the most significant departure from traditional thinking

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[39] Five C-ratings are currently used to identify unit combat status. Ranging in descending order from C-1 (fully capable), C-2 (partially capable), C-3 (marginally capable), C-4 (not capable), to C-5 (unit activation or conversion), these ratings only provide the status of selected logistics resources--fuels and munitions, for example, are not included. In 1986, SORTS replaced the unit and force status reporting (UNITREP/FORCESTAT) system in recognition that these ratings provide only a status of key resources and training not a comprehensive expression of a unit's overall combat capability. These changes were made to clarify misperceptions by the media that despite billions of additional dollars spent on defense readiness no significant change in C-ratings, and therefore no return on investment, had actually taken place. The use of WSMIS and aircraft availability goals in making these assessments are now prescribed in AFR 55-15. Further improvements to SORTS are being developed jointly by HQ USAF/LE/XO under the Air Force Capability Assessment Program (AFCAP).

about infrastructure requirements is the recognition that all logistics support processes and the tools needed to carry these out can be prioritized in terms of their direct or indirect impact and criticality base/unit operations. The worldwide communication system, for example, that links the bases and operating locations within the theater to the depot is a vital element of the C2 process. Similarly, logistics management information systems, transportation systems, maintenance systems, distribution systems, budgeting/accounting systems, personnel systems, weapon acquisition systems, and many other systems are essential parts of the overall infrastructure of the Air Force logistics system. Everyone of these processes have and continue to contribute to the creation, maintenance, sustainment, as well as the inevitable replacement of the force and infrastructure that exists today. Moreover, their individual contribution and, in turn, their relative importance to present and future combat capabilities can be measured and translated into Air Force-wide priorities under AFLOGCON.

Infrastructure processes in this context produce near and long-term combat support capability. To be as effective as possible, these processes must be integrated and balanced throughout the logistics system in a logical, systematic manner. AFLOGCON has the potential to meet this need. By linking direct and indirect combat support functions to existing and planned force and infrastructure requirements, AFLOGCON will lead to the establishment of a uniform and coherent baseline for Air Force-wide decision-making. The application of the latest information systems technology to this task will significantly improve the planning, programming, and execution functions of the Air Force logistics system.

The basic strategy for implementing AFLOGCON should initially focus on the high payoff, direct combat support functions that fail to meet the "system

specification" established by the logistics concept of operations. The end products envisioned under the Class IV and Class V modifications identified in Fig 14, for example, meet this criteria but may take on a relatively lower priority because of the level of effort involved and the long-term nature of the fix. Interim or "quick fix" solutions in these areas, however, should be expedited on a high priority basis to bring the logistics system to the highest state of readiness in the shortest possible time. Available capability assessment models should be used to identify system-wide high payoff areas for improving specific weapon system availability at the unit level. Efforts to develop advanced modeling/simulation techniques should be integrated within the logistics system and accelerated with the objective of fielding a capability that can (1) identify critical resource requirements for planning, programming, and budgeting purposes based on current and planned operations, and (2) allocate available resources within the logistics system--on a real time basis--to the highest operational priorities currently in effect.

Change Control Mechanism

To accomplish such a comprehensive prioritization of logistics functions, AFLOGCON must be institutionalized at all levels of the Air Force as the overarching logistics concept of operations by which all change actions within the system are judged. In order to do this, the strategic planning process shown in Fig 17 must be restructured as illustrated in Fig 21. Under this approach, AFLOGCON becomes the basis for determining the configuration of the Air Force logistics system and a template for evaluating external and internal change requirements. New or revised logistics guidance issued by the Office of the Secretary of Defense (OSD) or the Joint Chiefs of Staff (JCS) in the form of DOD logistics long-range planning guidance, the Logistics Annex of the Joint Strategic Capabilities

Plan (JSCP), and other policy or program decision papers should be filtered through the Air Force logistics concept of operations to determine the overall impact on the logistics system and its primary components.

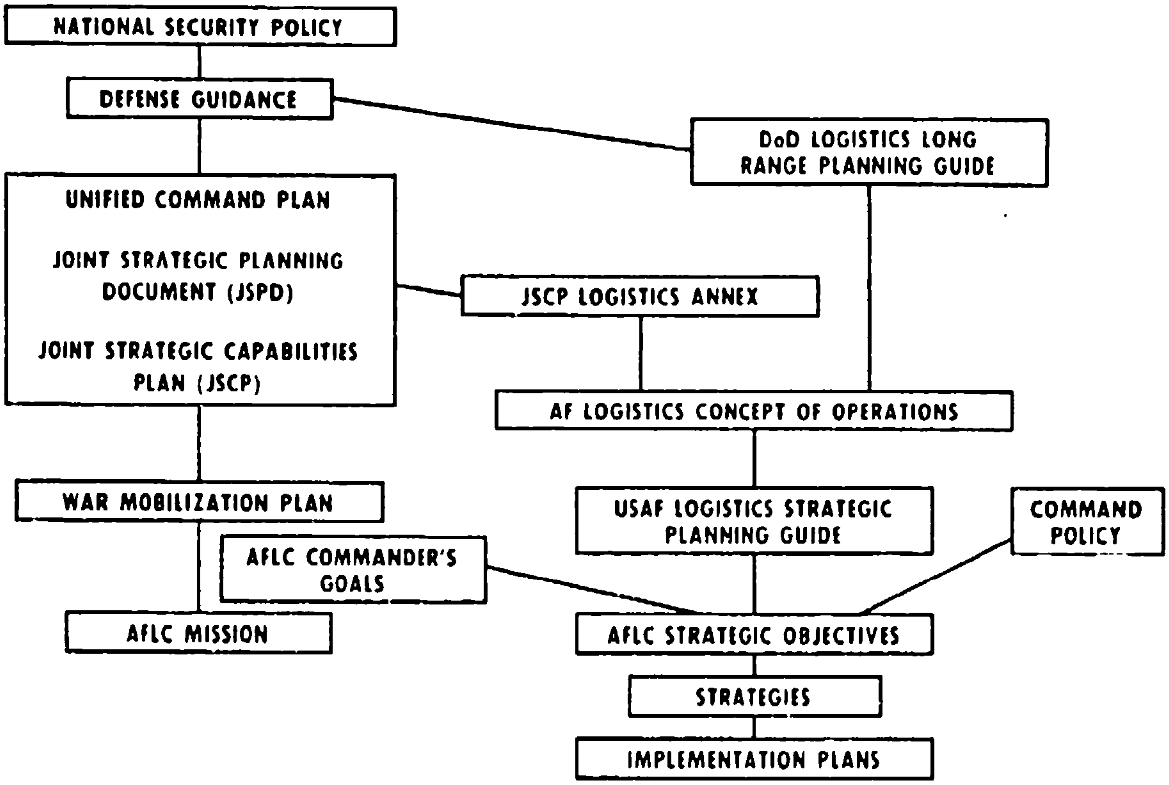

Fig 21. Proposed Relationship Between AFLOGCON & Strategic Planning.

Assessments of this kind will highlight specific weapon and combat support deficiencies, their relative priority to ongoing actions within the logistics system, and the need for system-wide reprogramming of current and planned resource commitments. Through such a mechanism, corporate decision-making at all levels of the Air Force will be driven by common strategic objectives that can be specifically related to and integrated across widely disparate functions of the logistics system. This process

would yield a hierarchy of functional targets that will guide all elements of the logistics system toward the ultimate goal of achieving maximum operational capability at the flightline now--and in the future.

AFLC's initiative to improve the strategic planning process will provide the "front-end" controls required to periodically assess the overall health of the Air Force logistics system, to determine the need for change, to revise strategic objectives as necessary, and to translate those objectives into specific plans and resource requirements. The Command's corporate board structure is in the process of being modified to institutionalize the Planning and Requirements Committee and its subordinate planning and requirements integration panels.[40] This formal review and decision-making body will exercise oversight of the strategic planning process and provide the central direction needed to ensure planning actions at all levels of the Command are consistent with approved strategic objectives. The PARC will also provide a forum for addressing new change requirements, developing corporate strategies, and promulgating Command policies that focus on better integration of planning, requirements, and programming functions within AFLC.

A number of other actions complement this move toward more systematic and institutional integration of logistics processes within AFLC. The CLOUT Program Office will be phased out with the transfer of overall concept development responsibilities to the Directorate of Plans (XPX) in February

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40 These changes were approved by the AFLC Council on 17 Dec 87 and briefed to Gen Hansen on 9 Jan 88. AFLC Headquarters Operating Instruction (HOI) 20-4 on the AFLC Headquarters Board Structure will be revised and upgraded into AFLCR 20-3 during FY88/2 to institutionalize this process. A revised AFLC Strategic Planning Guide will be published in Apr 88 and followed by the first meeting of the PARC in May 88. Infrastructure Requirements Documents (IRDs) will be the vehicle for translating strategic plans into action at all levels of the Command.

1988.[41] This realignment is consistent with Air Staff direction that the logistics concept of operations be defined by the long-range strategic planning community and used as a framework for strategic decision-making. The planned transition from CLOUT to AFLOGCON will broaden the resource base available for future planning actions and merge these initiatives into the mainstream of the strategic planning process. This consolidation of like functions will force a better understanding of the nature of AFLOGCON and its relationship to other strategic command initiatives. Despite these benefits, it's quite possible that progress under XPX could be slowed because the "plate is too full" and the center of gravity for program management is lowered from the directorate to division level.

The overall system integration actions undertaken by the CLOUT Program Office have proven highly successful when measured by the scope and magnitude of the task and the degree of positive change that has taken place within AFLC and the Air Force. A System Program Office (SPO) program management approach to developing and implementing the CLOUT concept within AFLC has paid handsome dividends in this regard. The lean yet high powered manning and directorate-level status of the CLOUT Program Office have provided enough resources and organizational leverage to define the overall concept, establish a framework for action, and work the most pressing issues.[42] While progress toward greater commitment to the program has

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[41] The functional responsibility for DRIVE and the associated resources applied to this effort by the CLOUT Program Office will be transferred to MM on 1 Mar 88. (25:1) The ASB and primary DCS members of the AFLC Council were briefed on this proposed realignment and presented with a FY88-90 road map for advanced design of DRIVE in Jan 88. A DRIVE Task Force will examine development options, resource requirements, and the structure of a Functional Integration Office (FIO) for integrating DRIVE into the existing LMS baseline. Corporate approval on a specific course of action is expected in mid-Mar 88. More details on this are contained in References 13 and 26.

[42] The CLOUT Program Office was originally authorized five slots (a Colonel, a Major, two GM-13s, and a GS-5 Steno) and staffed with a Lieutenant Colonel (Col Sel) to head the overall effort, a GM-13 to work

been slow in coming, the urgency of need has been widely recognized and formal actions to institutionalize AFLOGCON are underway. Air Force approval of the MAJCOM concepts of operations currently being developed for the logistics elements of AFLOGCON and major theater of operations will ultimately lead to a sharper focus on what needs to be done, a shift in corporate priorities, and greater allocation of dedicated resources to implementation of AFLOGCON. Those changes, however, will probably not materialize in the very near future. Even if this proves to be the case, the Directorate of Plans will face a tremendous challenge just to maintain the forward momentum achieved so far. Although corporate commitment to advanced development and AFLC-wide implementation of DRIVE has steadily increased, many of the essential structural changes identified in the CLOUT Action Plan have taken a back seat to make that happen. While many of these changes are closely tied to the decision tools provided by DRIVE, much work remains to define and integrate these changes across the full range of depot support provided by AFLC. Parallel efforts to modify the existing logistics system are extremely critical in the C2 and transportation areas. Without adequate logistics C2, the information AFLC needs to effectively allocate its combat support resources will be inadequate or unavailable. Similarly, without a preplanned, flexible transportation capability, AFLC will not have the means to move critical follow-on supplies and materiel required during the initial days of war to the point of optimum use. The broad scope of that task and the degree of management support required to bring about these changes are illustrated in Fig 22.

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[42] (Con't) the program within AFLC, a Major to manage the DRIVE Demo at Ogden, and part-time secretarial support. (27:2-3,2-7) The Director of the CLOUT Program Office will be reassigned to MM and two positions (Major/GM-13) will be transferred to support the establishment of the DRIVE FIO.

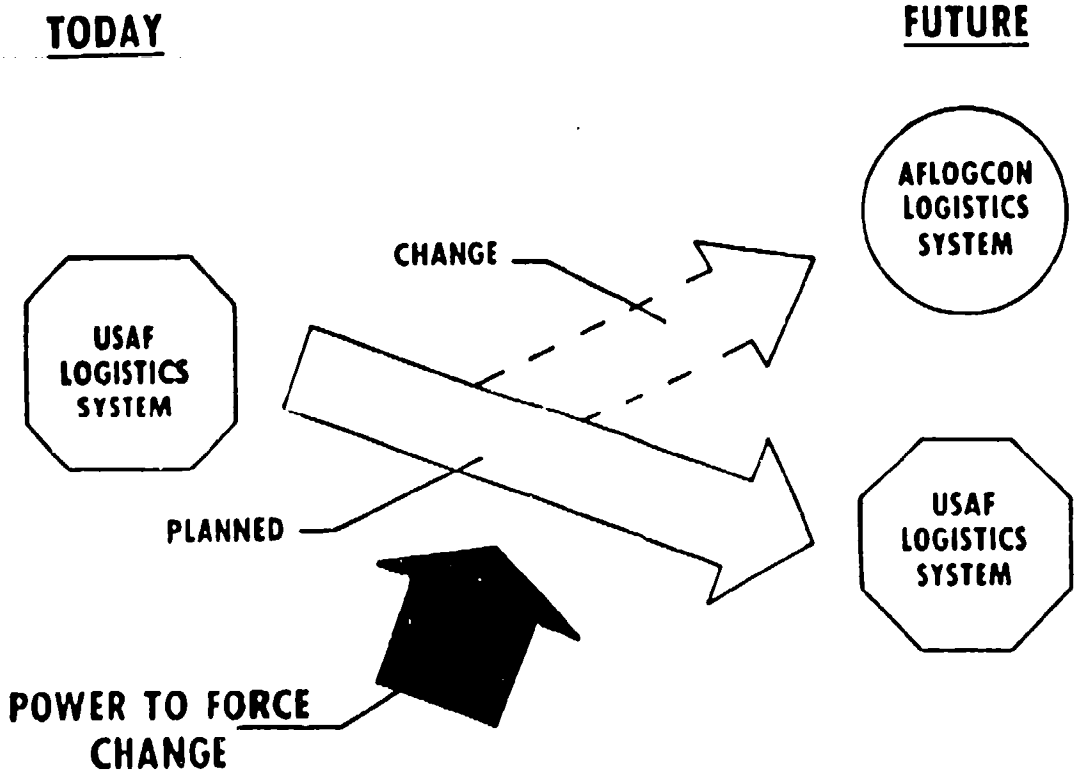

Fig 22. Force Field View of AFLOGCON.

The key point here is that AFLC will need a strong System Integration Office (SIO) and corporate commitment to ensure the new Air Force logistics concept of operations is implemented effectively across all logistics functions within the Command. While the Directorate of Plans is, in essence, responsible for such command-wide system integration, XPX is not structured as well as it could be to meet this need. Moreover, present plans call for the Concept, Doctrine, and Management Support Division to absorb the AFLOGCON concept development responsibility and to support that effort with the "fall out" resources that become available when the CLOUT Program Office is terminated.[43] This approach threatens to undermine the

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[43] This has been recognized and organizational alternatives, such as the consolidation of the Advanced Planning Division (XPXO) and the Concept, Doctrine, and Management Support Division (XPXC), are being considered to enhance integration of the strategic planning and infrastructure requirements functions.

level of eff a:d corporate commitment put into implementation of AFLOGCON within AFLC so far. Although there are a number of ways to deal with this problem, an organizational structure is required within which resources can be effectively applied to define strategic plans, identify system change requirements, and to follow through on implementation of CLOUT initiatives. A practical alternative that meets this criteria without sacrificing the directorate-level autonomy given to the CLOUT Program Office is presented in Fig 23.

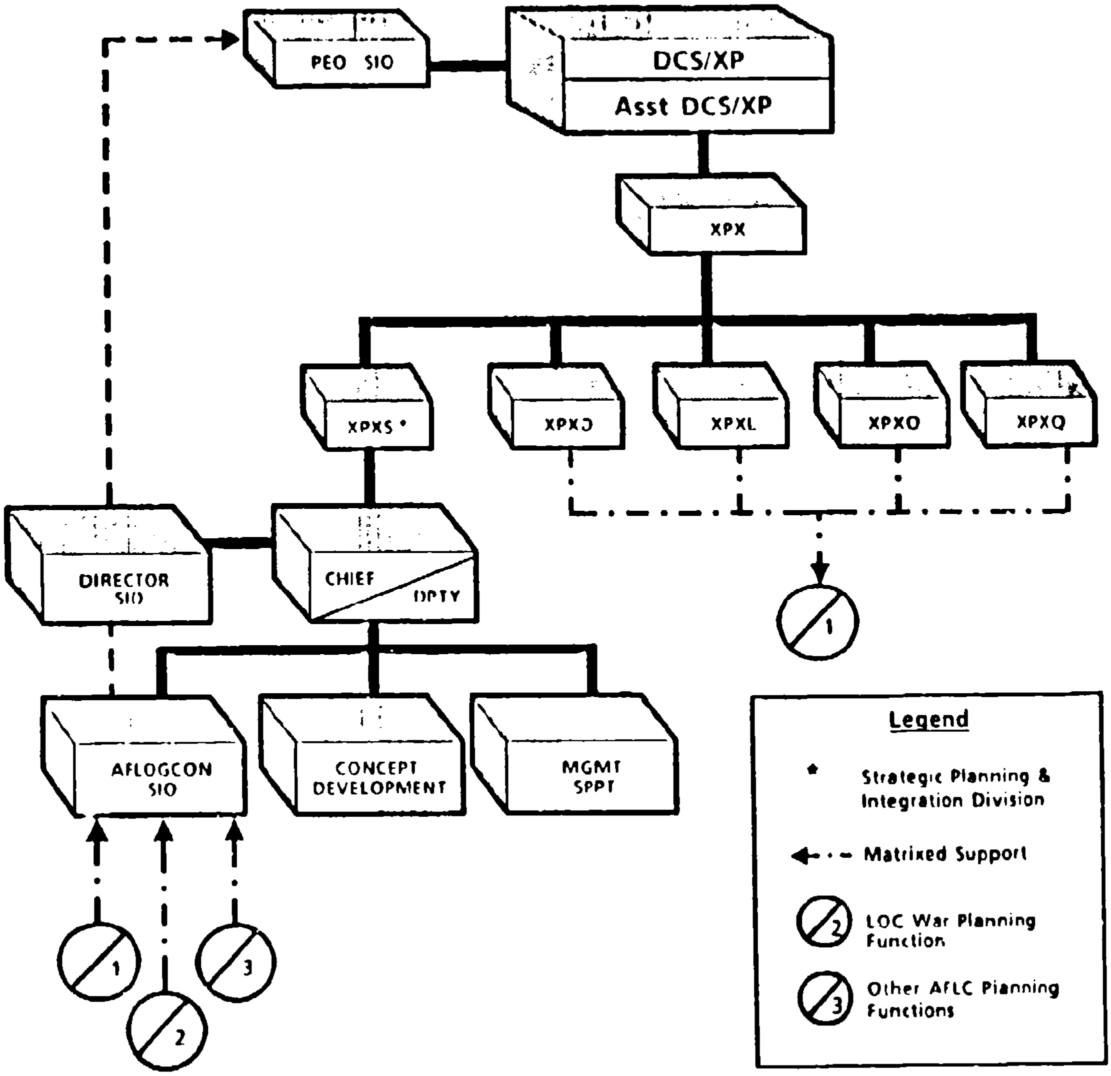

Fig 23. Proposed Strategic Planning and System Integration Organization.

Under this approach, the Advanced Planning Division would be merged with the Concept, Doctrine, and Management Support Division and redesignated as the Strategic Planning and Integration Division (XPXS). The Division Chief (Colonel - presently chief of XPXC) would be dual-hatted as the Director of the AFLOGCON System Integration Office with a direct reporting channel to the Assistant DCS/Plans and Programs; a Deputy Division Chief (Lieutenant Colonel - presently authorized as Chief of XPXO) would primarily be responsible for routine administration of the strategic planning, concept development, and management support functions. This arrangement will assure that AFLOGCON issues of a sensitive nature can be worked at the Colonel/Directorate-level and elevated directly to a Program Executive Officer (PEO) if resolution at the DCS-level is necessary.[44] The PEO will review program strategy, ensure proper resource allocation, influence staff support, and refer critical issues to senior management when appropriate.

Under the proposed SIO structure, the initial nucleus for system-wide integration of AFLOGCON within AFLC is envisioned to be the AFLC CLOUT Action Plan. Deliberately broad in nature, the objectives established in this plan focus only on the primary logistics infrastructure the Air Force depends on to support immediate combat operations. This "narrow" view of the combat support process should be broadened to provide meaningful direction and guidance to the remaining indirect combat support processes (e.g., weapon acquisition, budgeting, manpower, etc.) that are in their own way critical to maintaining and sustaining combat capability today and

[44] The PEO concept was implemented within the Air Force in Jul 86 in response to the Packard Commission's report ("A Quest for Excellence") on streamlining the defense acquisition process and NSDD 219 which directed implementation of the Commission's proposals. The objective of the PEO structure is to "simplify the . . . system by consolidating policy and oversight, reducing reporting chains, eliminating duplicative functions . . staffs can operate as centers of excellence." (78:1) The PEO reports to the designated Air Force Acquisition Executive (AFAE) who has final decision authority for all acquisition matters. For executive programs within AFLC, PEOs are normally the ALC commanders although other individuals, including the AFLC Commander, may be designated as a PEO.

more so in the future.[45] As illustrated in Fig 24, this plan should be converted into an AFLOGCON Action Plan to establish the foundation for system-wide integration. In addition to providing continuity to the

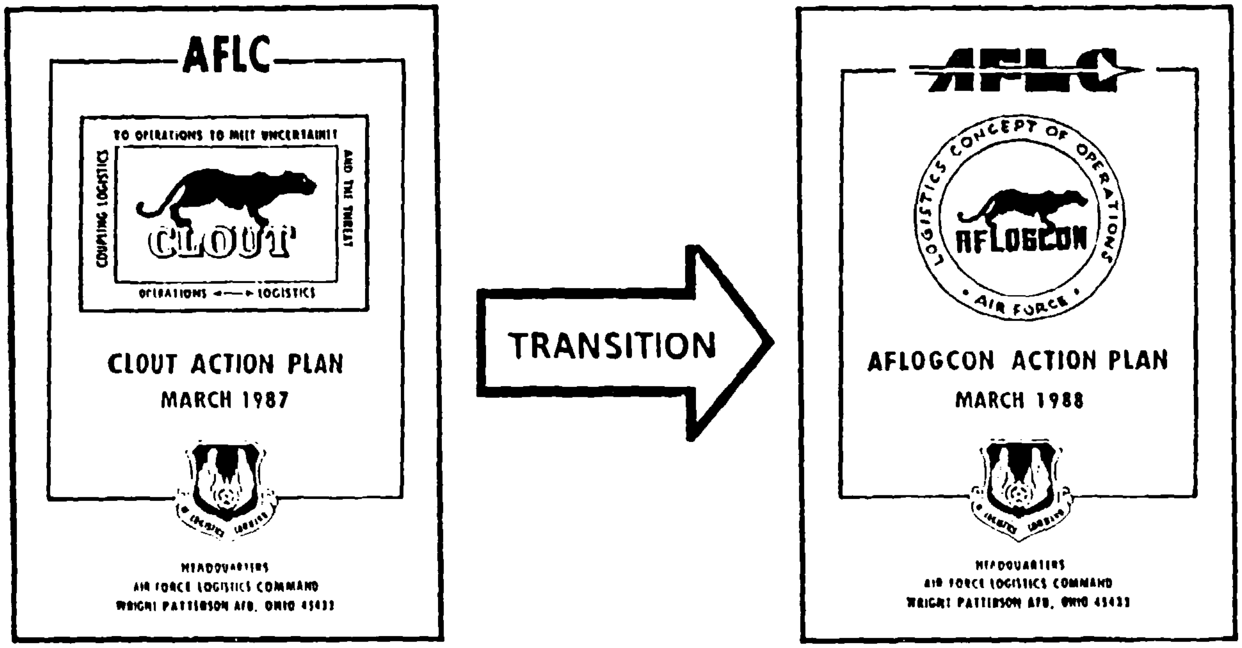

Fig 24. Action Plan Transition.

initiatives begun under CLOUT, this document could become a master plan for controlling all strategic actions within the Command. The SIO would be assigned the task of defining these relationships and establishing the appropriate controls to ensure that these efforts are effectively integrated under AFLOGCON. Matrixed support to the SIO should be provided by key headquarters and field staff functions involved in the new strategic planning process. Some of these functions, such as mission assignment and

operational requirements review, are presently accomplished within the Directorate of Plans and require only an internal realignment of resources. Other key functions, such as weapon system master planning, war planning, and acquisition planning, are accomplished by the DCSs, the Logistics Operations Center (LOC), the Air Force Acquisition Logistics Center (AFALC), and the ALCs.[46] Formal agreements, dedicated matrixed support, and integrated data base networks should be established to interface these strategic planning elements with the AFLOGCON SIO. Similar interfaces should be established with other MAJCOMs and the Air Staff to coordinate system-wide integration actions.

The existing organizational relationships between major Air Force components are not adequate for this purpose and should be modified consistent with the growing need to better integrate management actions across staff and line functions at all levels of the Air Force. The growth in AFLC's liaison programs with other external agencies (e.g., MAJCOMs, Defense Logistics Agency (DLA), Foreign Military Sales (FMS) countries, etc.) in recent years parallels the growing complexity encountered in today's weapon and support systems, and attests to the need for greater system integration. The development of a formal Air Force logistics concept of operations is further evidence that a more structured, systematic approach to logistics planning is on the way. As consensus is reached on the specific structural relationships of AFLOGCON, dedicated system integration offices at all levels of the Air Force will be required

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[46] This proposed integration is particularly crucial in the war planning area. War plans and command post operations were transferred from the Director of Plans to LOC/XO in 1982. This action separated the day-to-day management activities associated with the strategic planning and wartime planning functions. Dedicated matrix support to the SIO by LOC war planners will improve integration of strategic planning involving the Command's peace and wartime operating programs. Such support is consistent with the Air Force's objective to develop a logistics system that can effectively transition from peace to war without the need to reorganize. (18:8)

to ensure effective vertical and horizontal integration of implementation actions until major system changes have been fully implemented. These SIOs should be structured to take full advantage of the lessons learned to date with the traditional "hardware-oriented" system program management organizations (e.g., SPO, System Program Manager (SPM), etc.) that have evolved over time and the "process-oriented" program offices that have emerged in recent years. [47]

The CLOUT and RELOOK initiatives produced several innovative organizational proposals for meeting such a system-wide integration requirement. A draft Program Management Directive (PMD) for implementing a "Logistics Concept of Operations for the 21st Century" was developed by the CLOUT Program Office in August 1987. This PMD was patterned after the traditional hardware-oriented acquisition directives issued under the PMD framework and recent efforts to extend that Air Force-wide authority to broader system integration requirements, such as improved air base operability. The binding, directive nature of PMDs provides a vehicle for issuing program guidance and specific direction on organizational placement of the SIO function across and within Air Force MAJCOMs and Special Operating Activities (SOAs) until a suitable permanent organizational structure is selected.

Consistent with this concept, the draft PMD set forth "guidance and direction for the overall planning and coordination, systems engineering, development, integration, test, and implementation" of the Air Force logistics concept of operations. (29:1) A series of system program offices

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[47] The AF/LEY SIO for Information Systems, the LIMSS Program Office, the CLOUT Program Office, and the Air Base Operability organizations are examples of process-oriented program management organizations. These organizations consider hardware, software, organizational structure, people, decision-tools, and management policies in terms of their individual and collective contribution to the entire logistics system.

(SIOs) was proposed to coordinate concept development, system design, and implementation actions across major elements of the Air Force logistics system. [48] A joint Air Staff/MAJCOM General Officer Steering Group was also proposed to exercise oversight of the program's progress toward totally integrating "depot and theater logistics systems into a single, cohesive system capable of effectively assimilating and applying critical logistics resources to the Theater Commander's highest operational priorities under peacetime, crisis, and combat conditions." (29:22)

A more structured approach to controlling strategic planning at the Air Staff was proposed at FUTURE LOOK '87. Given the name VECTOR to suggest thrust and direction to the strategic planning process, this initiative sought to establish a forum for general officer oversight of strategic planning with a focus on evaluating and validating specific proposals for improving combat capability. Initially proposed as a four-tiered organization, VECTOR's highest tier was envisioned to be the LE Council (general officer approval) followed in descending order by an LE Board (general officer validation - Air Staff, MAJCOM/LGs, and AFLC/XP), a Combat Support Review Committee (Colonel level - selection and review), and five logistics panels--personnel, materiel, facility, information, and transportation--to refine logistics initiatives approved by the Combat Support Review Committee. Depicted in Fig 25, this organization was developed to integrate ongoing actions on six separate major efforts within

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[48] AFLC, PACAF, and USAFE were designated as the implementing commands and given lead roles in shaping standard depot and theater support systems. AFCC was designated a supporting command consistent with its responsibility for standard base information systems. MAC was designated a participating command to work changes to the defense transportation system and related C2 processes. In addition to specifying responsibilities for ATC and AFOTEC, the draft PMD also tasked AAC, SPACECOM, CENTCOM, TAC, SAC, and SOUTHCOM to participate in developing standard and theater or functionally unique support elements. Many of these commands are now involved in AFLOGCON concept development as shown in Fig 11.

the logistics community that all sought to define how best to fight the next war.[49] (30:1)

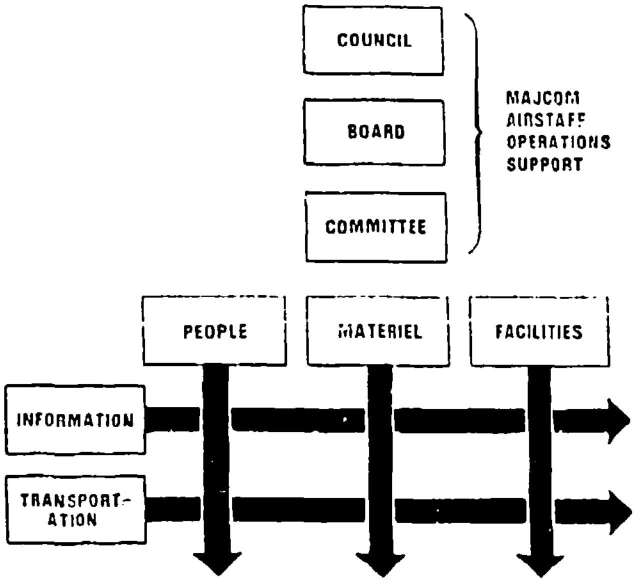


Fig 25. VECTOR Organization.

Although AFLC recognized that VECTOR provided a potential solution for cutting across the Air Force's functional organizational structure and focusing senior management attention on the combat support system as an entity, several concerns about its effectiveness were raised. The bureaucratic layering and lack of MAJCOM participation at the lower levels of VECTOR were considered major drawbacks. It was also pointed out that a clear logistics concept of operations must be defined so that VECTOR, or any other structure, would have a yardstick with which to measure the worth

[49] These efforts included a Scientific Advisory Board (SAB) study on Air Base Performance, RELOOK (AFLMC) , CLOUT (LEY), Logistics C3 (LEX), the Operations and Logistics General Officer Steering Group (XOO/LEX), and the Logistics Concept of Operations (LEX).

of future proposals to improve the combat support process. The potential duplication between VECTOR and the FUTURE LOOK/Strategic Planning process was also recognized as a factor that must be considered. (31:1-3)

While no actions were taken to institutionalize VECTOR, a deliberative planning structure is needed at the Air Staff to define AFLOGCON in greater detail and to integrate development and implementation actions at Headquarters USAF. The establishment of an AFLOGCON SIO with a core of dedicated strategic planners and matrixed support from key Air Staff functions--similar to the proposed SIO in Fig 23--should be considered for this purpose. Such application of the matrix concept will create new vertical, horizontal, and diagonal relationships among key Air Force organizational components involved in strategic planning. It will also allow management to place emphasis on implementation of AFLOGCON in concert with individual functional goals. These interactive relationships can produce the needed synergism that comes when subprogram elements are effectively integrated into a unified total program without breaching cost, schedule, supportability, and other technical thresholds. (33:105-106) Existing resources applied to strategic planning and related system integration efforts (e.g., AF/LEY SIO for Information Systems) should be consolidated within the AFLOGCON SIO at Headquarters USAF.

Decision Criteria

Strategic decision-making within DOD and the Air Force is guided by a series of hierarchical objectives that trace their origin to national security policy and strategic guidance issued by the President or the Secretary of Defense. The Office of the Secretary of Defense also issues policies, procedures, and objectives that ensure compliance with statutes or regulations issued by other Federal departments or agencies. Within

that framework, "our highest priority is to improve the readiness of our existing forces." That in itself, however, is not enough. No matter how large or modern U.S. forces are, we have no real combat capability if our forces cannot be sustained until hostilities are successfully terminated. To meet these objectives, defense guidance prescribes that logistics support concepts "must keep our forces in a high state of readiness; be able to respond to short warning, rapid deployments; be flexible enough to work anywhere in the world; and be able to sustain combat operations until the industrial base can be fully mobilized." (32:5)

As if this isn't challenging enough, defense logisticians "must also continuously strive . . . to ensure the logistics system operates in the most cost-effective manner possible." Seeking out more efficient means of providing logistics support to the forces and giving operational supportability and operational requirements equal emphasis during the systems acquisition process are stressed. In addition to nine logistics tenets under readiness, sustainability, flexibility, and survivability, DOD planning guidance establishes a number of specific requirements among which are the need to "provide 100 percent fill of war-required initial issue quantities of combat and support equipment and supplies for all active and reserve component units" and to "preposition enough equipment, munitions, fuel, and secondary item war reserves in strategic overseas locations to satisfy expected combat consumption through the time when a resupply pipeline could be established." (32:8)

These planning guidelines are at times too detailed, too broad, or overwhelmingly demanding, and presented without the systematic relationships required to uniformly translate objectives into plans and actions at all levels of the defense logistics system. Although more defined and focused on the role of worldwide operating bases and the Air

Logistics Centers, the Air Force strategic planning guide does not establish the decision framework one needs to determine which changes to the logistics system and its components will produce the highest return in combat capability. On a positive note, however, it is recognized that "only through a systematic approach linking long-, mid-, and near-term planning and programming--emphasizing the total system--can logistics optimize warfighting capabilities." (18:1)

Compared to this ambiguous guidance, AFLOGCON provides fixed points of reference and critical interrelationships that can be applied in a practical manner to guide strategic decision-making at all levels of the Air Force. Such a decision criteria is acknowledged as needed to guide the integrated strategic planning process now being introduced within AFLC. To understand how AFLOGCON can fill this void one must first look at how logistics is defined today and then consider how it is perceived and dealt with from a day-to-day perspective. The JCS have defined logistics as follows:

> "Logistics - The science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, those aspects of military operations which deal with: a. design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of materiel; b. movement, evacuation, and hospitalization of personnel; c. acquisition or construction, maintenance, operation, and disposition of facilities; and d. acquisition or furnishing of services." (34:213-214)

In this context, logistics encompasses all phases of the weapon system life cycle, including RDT&E and O&M, and impacts the full range of resources required to establish, maintain, and upgrade combat capability in the field. The immense scope of logistics has traditionally been viewed as illustrated in Fig 26.

Management of logistics resources (the "eye" in the sky) within this framework provides an "unfocused" set of logistics priorities that recognizes the fundamental relationships between basic research and practical

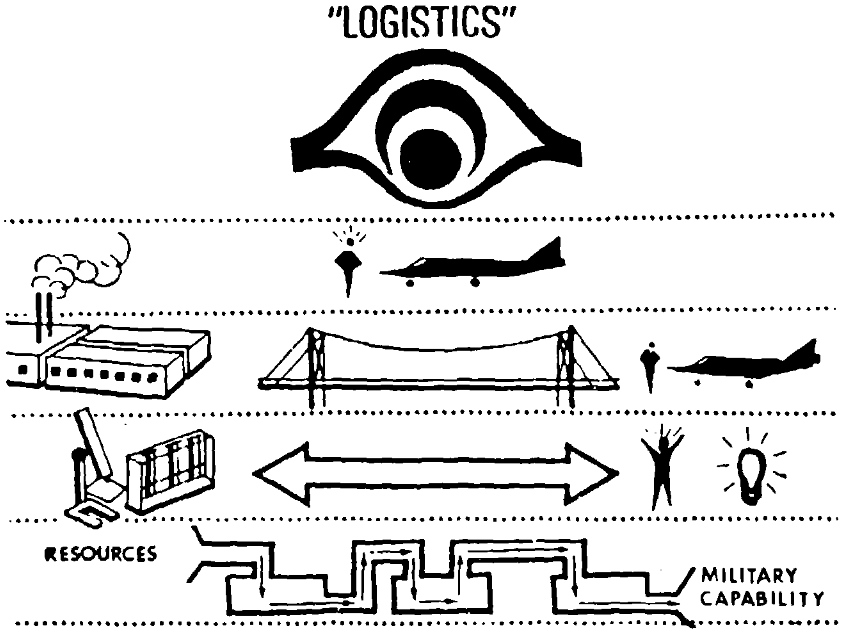


Fig 26. Traditional View of Logistics.

applications of technology, the essential bridge between the factory and the flight-line, and the "cutting edge" at the base/unit level. The resource management system of the Air Force establishes a dollar and responsibility/cost center-oriented framework through which resource requirements at each of these levels can be translated into "military capability." The maze of actions associated with this process are extremely complex and confusing. This tends to blur and, at times, obliterate any trace of the cause and effect relationships that do exist between vital resource decisions and their impact on combat capability.

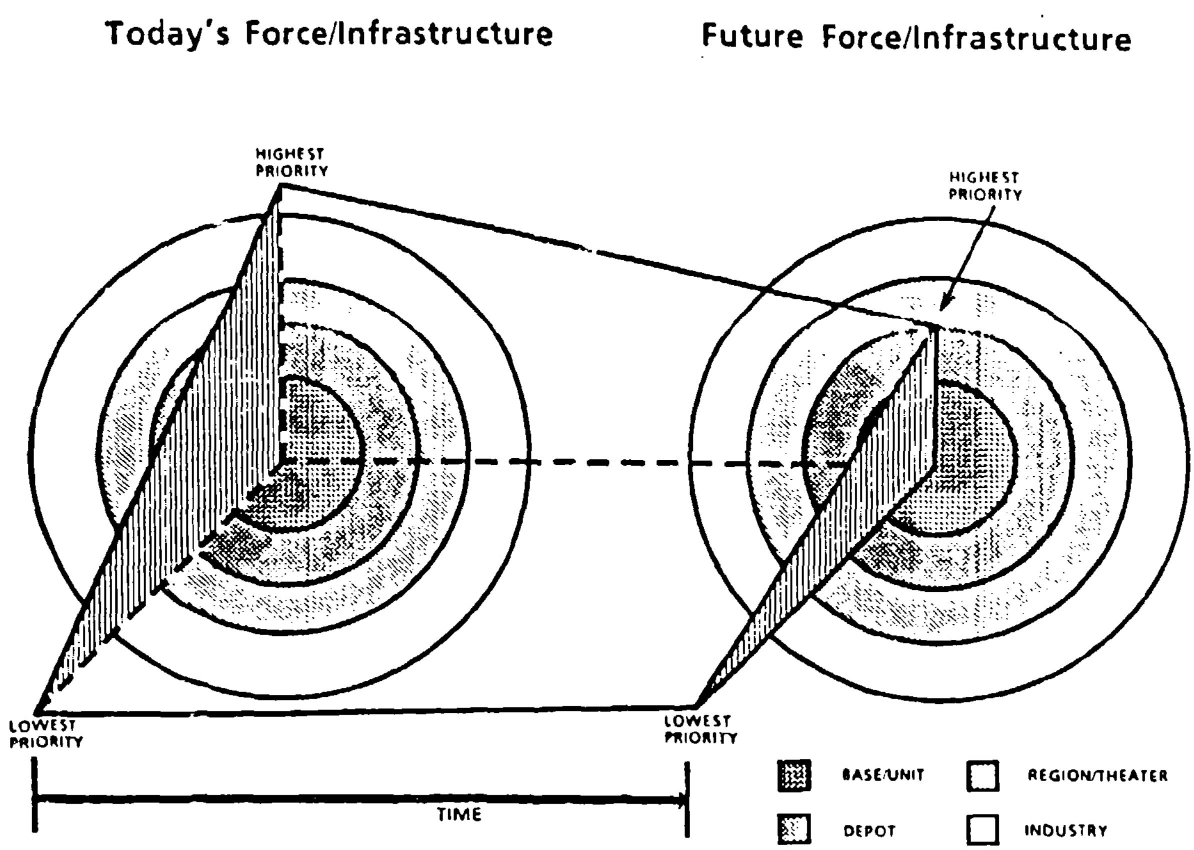


Fig 27. Priority Scheme Under AFLOGCON.

Under AFLOGCON, a much more defined set of relationships can be established between all elements of the logistics system and their contribution to warfighting capability. The priority placed on any aspect of the planning, programming, and execution phases of logistics operations should be derived based on the impact it is expected to have on the present and future force and infrastructure of the Air Force. Illustrated in Fig 27, the highest priority must be placed at the base/unit level where today's weapon systems are located. As the impact of an ongoing program or a new initiative is further removed from direct operations at the flight-line, a lower relative

priority should be assigned. Stockage of critical spares at forward stockage points in-theater, for example, would receive a lower priority than the activation of new PDS. This is the case because these aircraft will make a more direct contribution to increased FMC rates at operating locations by providing rapid redistribution between bases. Similarly, an upgrade at the depot should receive a relatively higher priority if the result is estimated to increase combat capability in the region/theater or at specific operating locations.

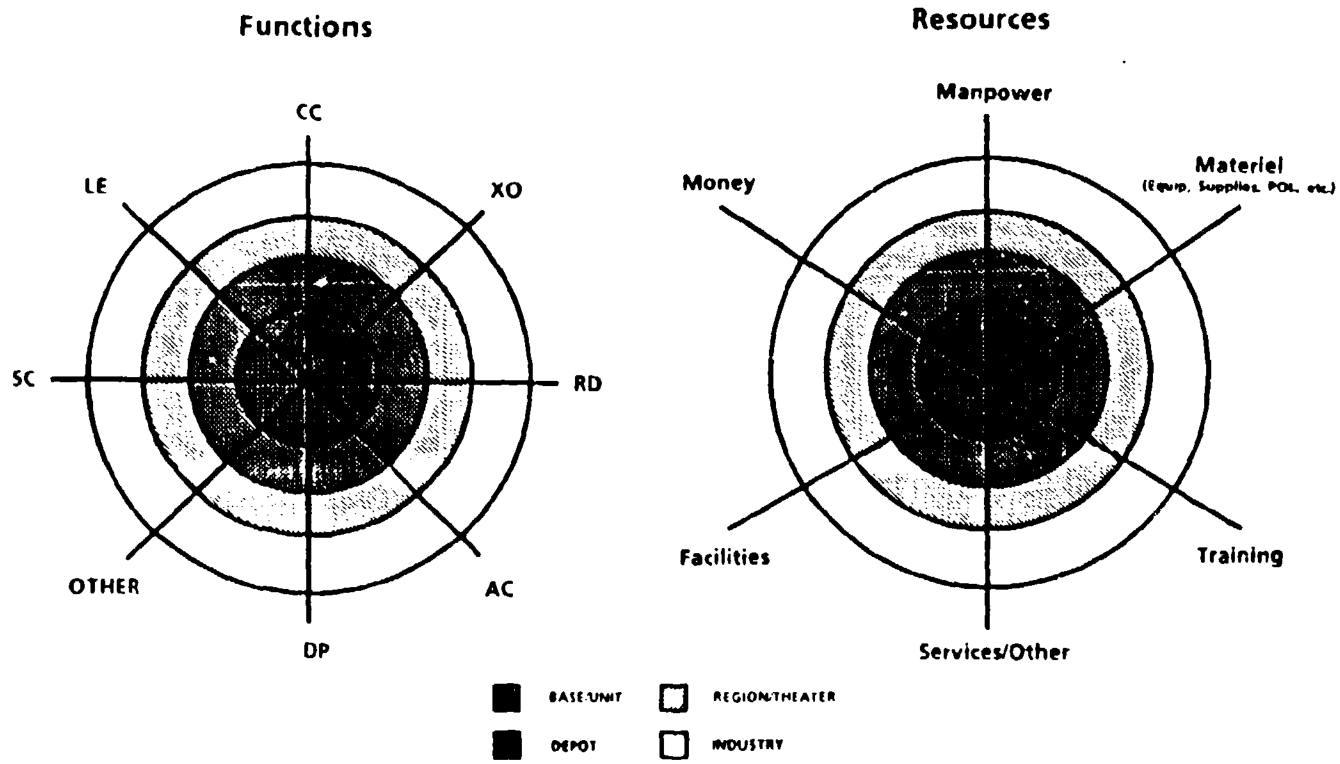


Fig 28. Organization and Resource Relationships Under AFLOGCON.

Consistent with defense emphasis on readiness, this approach places a descending order of priority on programs, initiatives, and actions that have less impact on direct combat capability at the present time. A

complementary descending order of priority must also be placed on those programs, initiatives, or actions that will improve the future force/infrastructure of the Air Force. Initiatives that yield a near-term payoff should, of course, be assigned a relatively higher priority than mid- or long-term initiatives. Within the two-dimensional space (time and proximity to direct combat capability) shown in Fig 27, all Air Force programs can be prioritized against a common set of parameters. Fig 28 illustrates how specific organizations and their functions as well as the basic resources required to carry out their unique missions should be viewed under AFLOGCON.

Programs carried out by AF/RD, for example, will predominantly affect the force/infrastructure in the mid- and long-term except for those acquisition programs that are scheduled to reach IOC or FOC in the near-term. Those in the latter category would normally receive higher priority when budget cuts or funding constraints must be absorbed. Indirect programs, such as personnel recruiting and retention initiatives, should similarly be weighted based on their time-phased impact.

The basic decision-making criteria AFLC has used to rank the full range of logistics programs submitted in the FY88 POM is illustrated in Fig 29 to show the many diverse factors and complex interrelationships that must be dealt with under the existing prioritization process. While the proposed priority scheme for AFLOGCON will not necessarily make the process less complex, it will provide a common frame of reference for effectively prioritizing competing logistics programs, new initiatives, and day-to-day operations at all levels of the Air Force. Generic decision rules for this purpose are presented in Fig 30 to illustrate how this priority scheme could be translated into action.

RANK	RANKING CRITERIA
1	POM strategy e.g., *emphasize core logistics (especially sustaining engineering) and deemphasize infrastructure (especially LMS and manpower).*
2	Defense Guidance (DG) e.g., emphasize readiness.
3	Planning Input for Program Development (PIPD) e.g., emphasize readiness objectives (spares, stock fund, weapon systems support), mods and DPEM.
4	Congressional objectives or legislative requirements e.g., buy-out programs, specific acquisition periods, replacement year goals, and contractor versus organic guidelines.
5	Commander's priorities e.g., quality of life, image of the Command, financial management, weapon system support, and ADP modernization.
6	AF Logistics goals e.g., organize for wartime ops and conduct peacetime ops within that framework, develop logistics support for varying levels of conflict, include logistics at forefront of planning and weapon system design, improve logistics resources for combat capability.
7	AFLC strategic objectives e.g., make logistics supportability equal to cost, schedule, and performance, emphasize R & M.
8	War plan and weapon system assessments e.g., marginal and unsatisfactory support posture.
9	Weapon system support priorities e.g., combat-related missions, black programs.
10	Peacetime vs wartime considerations e.g., emphasise POS first.
11	Timing e.g., IOC and FOC dates, PMRT.
12	Cost benefit analysis e.g., immediate buy more economical, significant cost avoidance possible, significant return on investment payback possible (especially with manpower savings).
13	Political support e.g., SAF-CSAF direction, previous support of Air Staff Board structure.
14	Criticality e.g., lack of funding or current funding profile makes program unexecutable, slips program, causes significant impact on combat readiness, causes unnecessary costs in the long run, or weapon systems support capability does not exist.
15	Execution probability e.g., consideration of obligation and commitment rates (history & forecasts)
16	Other priorities e.g., historical corporate rankings (POM, cut drills), Program Manager and user rankings.

Fig 29. Internal AFLC Ranking Criteria - FY88 POM. [50]

Under this approach, four priority categories are established to guide corporate actions. The highest priority is placed first on programs that maintain or improve the combat capability at the base/unit-level (Cat I), and then in descending order on regional or theater capability (Cat II),

50 Initially developed in 1986, these guidelines have been used by the AFLC staff to develop recommended priorities for Program Decision Packages (PDPs) submitted through the POM cycle. The rank order of PDPs is reviewed and formally approved through the AFLC Board Structure. This criteria is now incorporated in the PDP Support Materiel Questionnaire and used in conjunction with the PDP Monitor's Handbook to develop and prioritize new initiatives and "disconnect" actions. More details on PDP processing within AFLC are provided in Reference 35.

AFLOGCON PRIORITY DECISION RULES

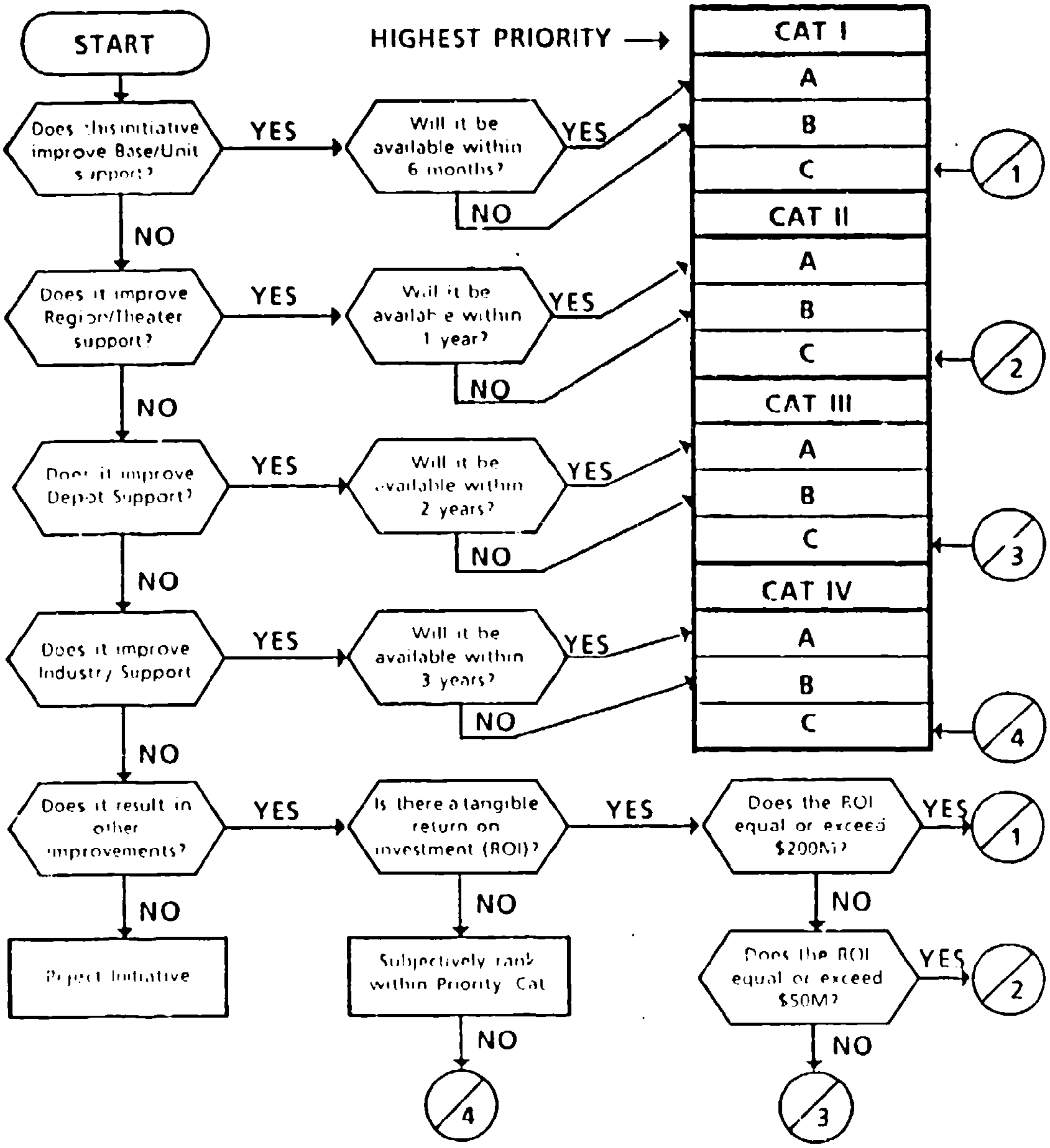
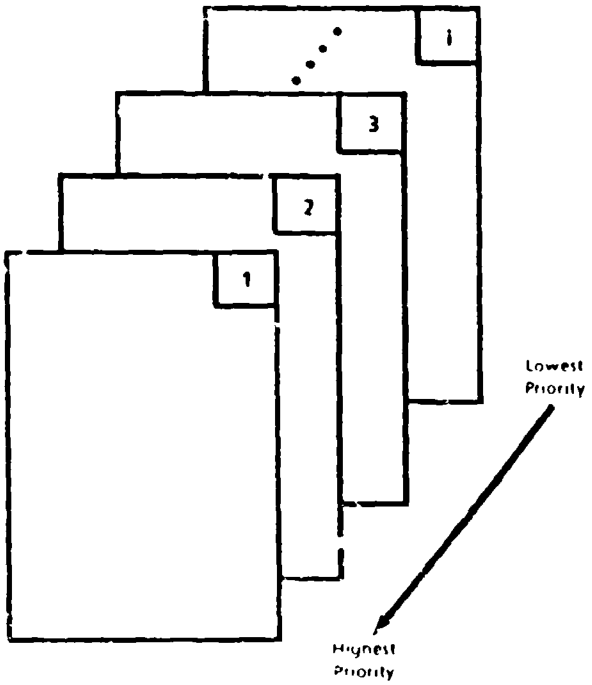


Fig 30. AFLOGCON Decision Tree.

depot support (Cat III), and commercial sources (Cat IV). Within each of these categories, a distinction is drawn between programs that make a meaningful contribution to the existing force/infrastructure in the near-term (Cat A - six months or less) and the long-term (Cat B - seven months or more).

Within these basic four categories, specific rank ordering should be accomplished based on measurable improvements to direct combat operating capability. Fig 30 illustrates this "rack and stack" process. Gains can be measured in terms of meaningful operational variables, such as sortie generations, FMC aircraft availability, turn time, and resupply time. Many of these expressions of combat capability are rapidly gaining widespread acceptance within the Air Force and standard methods for computing these



RANK/ORDER	ESTIMATED VALUE
1	+ 150 Sorties
2	+ 100 Sorties
3	$200M ROI
4	+ 40 Sorties
5	Intangible
6	+ 20 Sorties
•	•
•	•
i	Intangible

Fig 31. Sample Rank/Order Within AFLOGCON Priority Category.

are now evolving into everyday use. The all-encompassing nature of AFLOGCON will encourage the establishment of more finite indicators of combat capability that can be applied to many of today's indirect logistics support functions. [50A] These indicators will be complemented by subjective judgments involving high dollar ROIs associated with greater efficiencies and other intangible factors which cannot be accommodated by mathematical expressions of warfighting potential.

The Change Process

The broad scope of change envisioned under AFLOGCON impacts all elements of the logistics system. As illustrated in Fig 22, existing and planned programs, organizations, management information systems, and other essential resources must be realigned to carry out the new concept of operations. Such massive, system-wide change will create challenges for managers at all levels of the Air Force. To effectively achieve this goal, the process for introducing change must be understood. Key factors that can inhibit or accelerate change toward the desired end objective must be recognized and dealt with on a proactive basis. Past experience in implementing major conceptual changes to military systems--successes and failures alike--should be drawn upon to neutralize obstacles that stand in the way of progress and to increase the odds in favor of positive results.

The trigger behind the need for change is the knowledge of what needs to be done to achieve a specified goal, to maintain a desired state of readiness, or to shift to a new course of action in response to a changing environment. Once knowledge is gained, attitudes can be changed, behavior modified, and concepts translated into actions. Studies in the behavioral sciences have shown that this transition through the levels of change from knowledge to action takes progressively longer time at each step of the

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50A A complementary way of looking at the total logistics system is presented by General Mullins in **The Defense Matrix.** Managing the bottom-line by focusing on critical measures of combat capability at all levels of the logistics system recognizes that we "need to better integrate the military and the defense industry so that the entire spectrum of military-industrial activities is focused on the single goal of providing for the national defense." (44:115) The vectograph techniques proposed by General Mullins and advanced algorithms, such as DRIVE, are among the many complex management tools that can be applied systematically via advanced technology (e.g., high speed data systems, telecommunications, and artificial intelligence) to simplify and improve the defense resource allocation/-prioritization decision-making process.

change process. This is particularly true when force or compliance is not a factor. Illustrated in Fig 32, changes in knowledge are easier and take less time to make than attitudinal changes which can be emotionally charged in a negative or positive manner. Behavioral changes by the individual, and subsequently the group or organization, are more difficult and take longer to effect. (36:2)

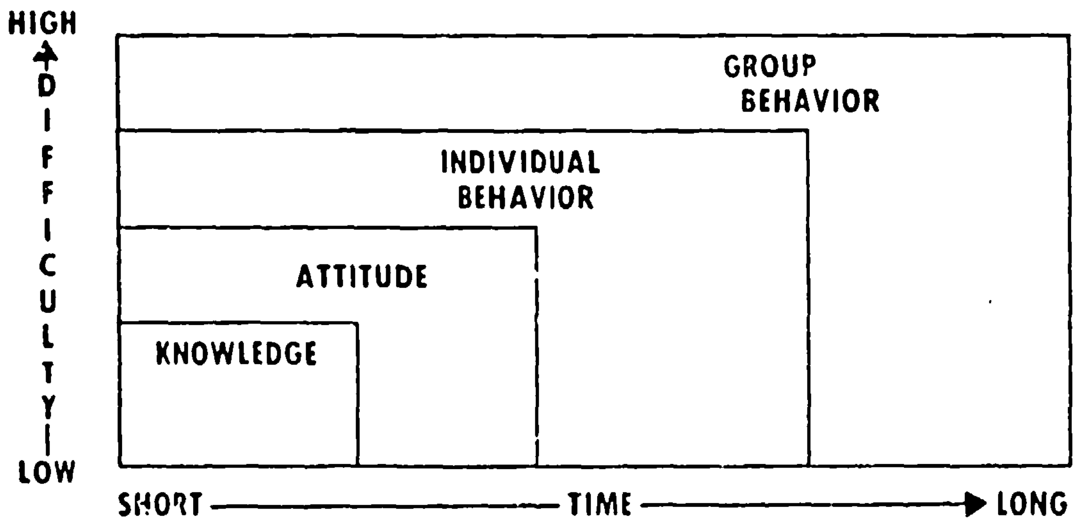

Fig 32. Time & Degree of Difficulty Associated with Change Process. (36:3)

Since all change actions follow this pattern, the question becomes one of how to best manage the change process itself. Given the magnitude and complexity of the changes involved with AFLOGCON, it is clear that two basic ingredients are required for effective implementation. First, an unambiguous expression of what needs to be done must be institutionalized within the Air Force. A compelling description of the logistics system's deficiencies and a broad blueprint for fixing those problems must be

developed in terms that can be understood and supported at all levels of management. Secondly, corporate commitment must be put behind the change process in "thought, words, and deeds." Emanating from the highest levels of leadership of the Air Force, power and influence must be brought to bear to assure that people at all levels of the logistics system are aware that higher authority supports the need for change and is prepared to redirect programs and resources to implement the new concept. Those "external forces" in and of themselves will significantly compress the time required to implement AFLOGCON by subordinate organizations directly involved in the change process.

Organizational structures and controls for implementing AFLOGCON within the Air Force should be established to follow through on corporate commitment to this initiative. Such action must be based on the recognition that "concepts are the wellsprings--the ideas, with their buried and exposed assumptions--that drive the character of our forces and the manner of their employment. They form the abstract links between resources and objectives. How shall we employ x to achieve y? Or simply what can we do to achieve y?" Despite the fact that successful concepts have drastically changed the course of history and the odds of battle, "most were born of pressure, meeting resistance from older ways of doing things until the demand for change was urgent." (37:2) Existing DOD and Air Force organizational mechanisms (e.g., SPOs, PEs, PEMs, DCPs, DSARCs, MAISARCs, etc.) focus on bringing new weapon systems into the inventory without giving adequate attention to the importance of concepts. Parallel structures, such as "Concept Management Offices and monitors for alternative strategies, innovative modes of employment and new missions which challenge the status quo and imply major organizational adjustments" are needed to explore, nurture, and capitalize on promising alternative concepts that are not tied directly to specific hardware solutions. (37:13) Even if all of these

steps are taken, the basic environment in which individuals perceive the need for change and act on that need must be understood to facilitate positive change actions. The new or revised concepts of operations now under consideration have conjured a variety of images in people who have been exposed to these ideas. While broad consensus exists that AFLOGCON is the right solution for dealing with known uncertainties under peace and combat conditions, substantial resistance to the concept has been experienced in certain quarters. Illustrated in Fig 33, this phenomenon appears to be related to the normal resistance associated with changes that are not yet directive in nature. It is also linked to the growing technical complexity that must be dealt with over time.

The system changes that must be made under AFLOGCON are staggering from any point of view. The technology required to effectively deal with this complexity is gradually beginning to emerge. Those who have closely worked with advanced models and algorithms, such as Dyna-METRIC, LCOM, TSAR, TSARINA, and ELCAM, are familiar with the state-of-the-art and generally know that the capability to translate AFLOGCON into action is already on the shelf just waiting to be applied. Their "expert" (low risk) view of AFLOGCON tends to produce an overly optimistic assessment that can, in the extreme, lead to premature actions. The "nonexpert," on the other hand, has a tendency to view AFLOGCON too pessimistically (high risk) in light of the lack of knowledge and experience with the intricacies of this technology. Overt resistance and aggressive action to prevent change to the status quo is a persistent trait. Changes of whatever type produce individual and organizational reactions that fall somewhere between these two extremes. The challenge of implementing AFLOGCON demands that the talents, skills, and resources of both proponents and opponents of the concept--or the policy, procedural, organizational, and system changes it drives--are channeled toward common objectives. This requires a realistic

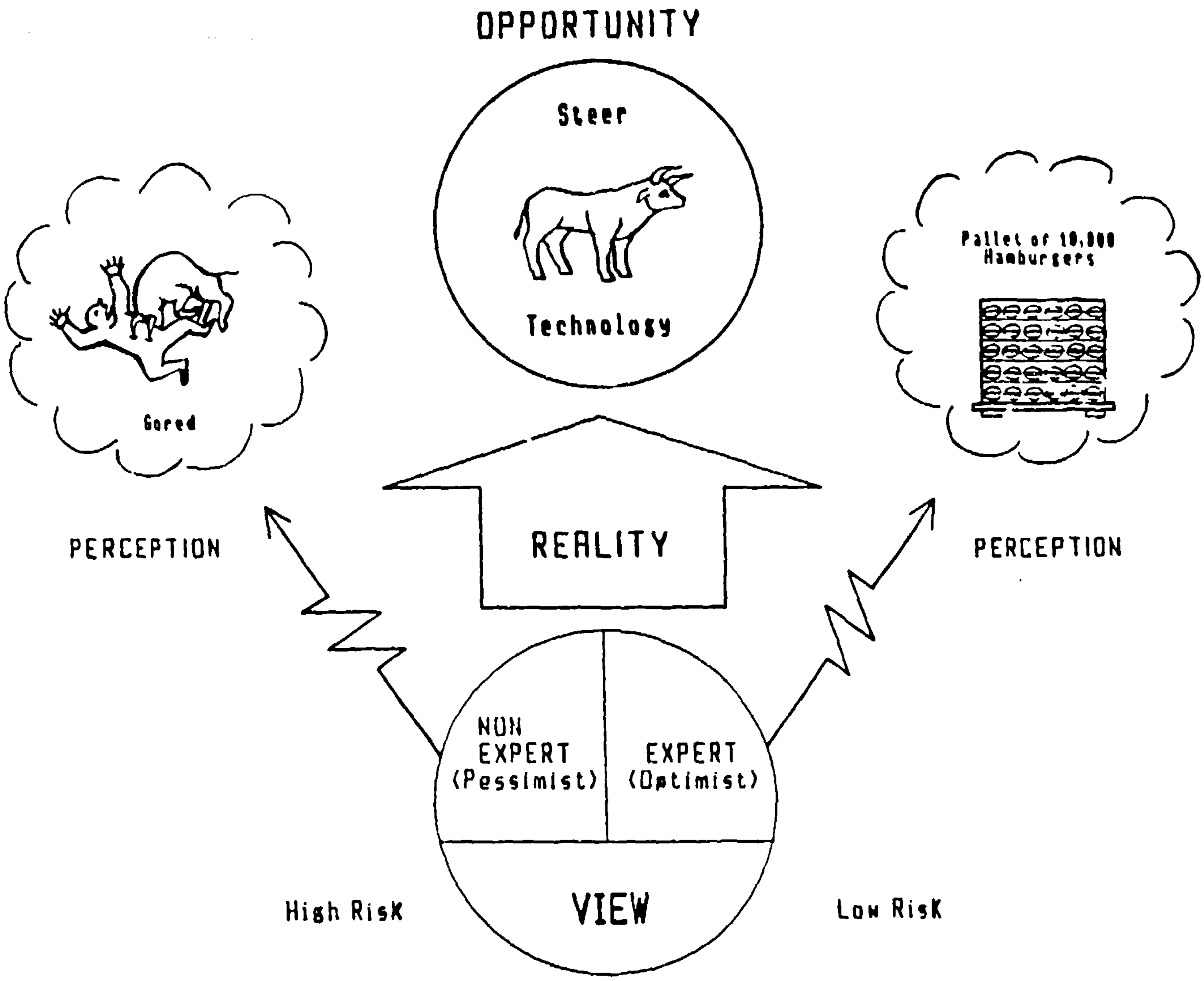

Fig 33. Perception of Change - Threat Versus Opportunity.

view of what is at stake, what can be accomplished, and effective interaction between managers that control critical elements of the change process. Tact, skillful negotiation, and open communication are absolutely essential to forward progress under any conditions. In this environment, horizontal and vertical conflicts between organizational elements should be resolved through voluntary goal congruence, with elevation of issue resolution to higher levels of authority only as a last resort.

Success in this context can easily be jeopardized if changes are forced upon the system without due consideration of individual and organizational perceptions of the need and the ability to make the necessary changes. A fine balance between competing organizational objectives should be found to ensure goals are moderately difficult and potentially achievable.[51] Moreover, across time, interim goals should be reviewed and adjusted periodically based on actual performance and progress toward the end objective.

The lessons learned with cancellation of the Advanced Logistics System, in December 1975, underscore the need to make large-scale, state-of-the-art system changes in an evolutionary manner and to avoid sudden radical change if at all possible.[52] That experience demonstrated that massive changes to either systems or programs, hardware, or system software can bring about trauma in the smallest and largest organizations, but "changing all three can be an absolutely herculean task. Thus, the systems planner who wishes to change all elements should either have a plan which is technologically sound enough to assure him at regular intervals that the capability of all elements mentioned is sufficient, or have an alternate position which allows the elements to be developed sequentially." (38:36)

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[51] Known in biology as the "overload" principle, this recognizes that strength (or improvements) cannot be increased by tasks that can be performed easily or by tasks that cannot be performed without injury to the organism. Environmental changes must also be factored into this iterative process. (36:43) Environmental changes must also be factored into this iterative process. In this context, if the electricity goes off in a storm, for example, one cannot watch television or read unless backup systems such as generators, flashlights, or candles are not available. (36:27)

[52] One of the largest projects ever undertaken by the Department of Defense to upgrade data processing capability, the ALS experience forced the Air Force to return to using primarily second-generation systems in a world where third- and fourth-generation technology was the state-of-the-art. (38:37)

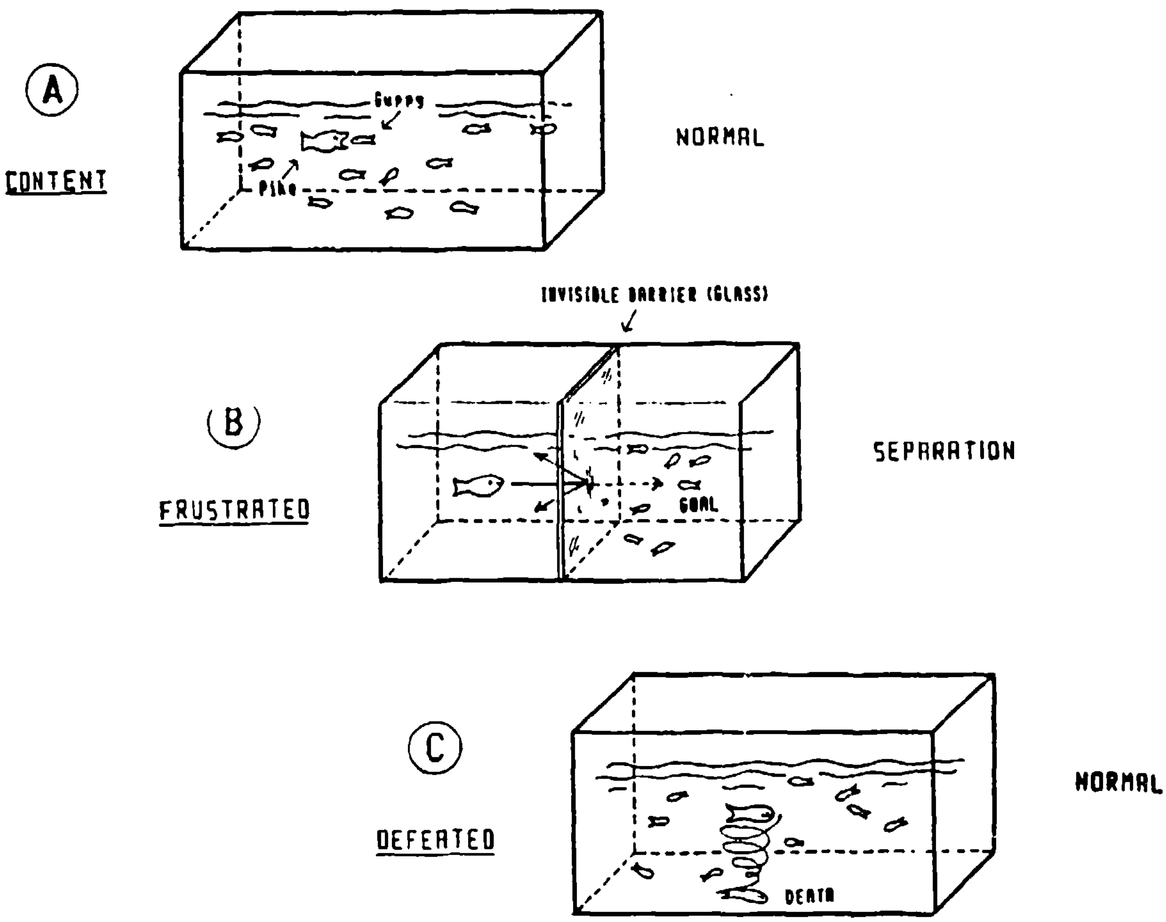

Fig 34. Behavioral Response to Environmental Changes.

The key point here is to recognize that highly complex, large, and interdependent institutions seek, as is the case with living systems, to maintain a state of equilibrium that rests on a satisfactory balance between internal and external needs. (39:145) As changes occur in these two dimensions, adaptive actions must be initiated to bring the system back to a steady state. How quickly such an adaptive mechanism senses and responds to major changes determines to a large extent how well a system will accomplish its intended purpose. In turn, an inability to sense the need for such change and excessive delays in corrective action will lower

overall system performance and ultimately threaten its very survival. While that conclusion is relatively self-evident, actual experiments with living organisms have demonstrated that perception--the interpretation of reality--can play a significant role in determining the success or failure of coping with sudden or dramatic changes in our environment.

Fig 34 illustrates the negative side of this phenomenon. In phase A of the experiment, a pike was placed in an aquarium along with many minnows. After the pike became accustomed to this plentiful supply of food, a sheet of glass was placed between it and the minnows. In phase B, the pike's behavior remained normal until its need for food increased. As hunger grew, it tried harder and harder to get to its food. Finally, after repeated failure, frustration set in and the pike made no further attempts to eat the minnows. Even in phase C with the glass removed and the minnows now readily available, the pike made no effort to satisfy its hunger. Eventually, it died of starvation while in the midst of plenty of food. (36:27) A similar example of perception but with a somewhat more positive outcome is described in **In Search of Excellence.** In support of conclusions that "loosely coupled systems" demonstrated superior adaptability, the authors cite Karl Weick's quote that "No one is ever free to do something he can't think of." and an experiment with bees and flies described by Gordon Siu. In this experiment, twelve bees and twelve flies were placed in an open glass bottle that was laid on its side with the bottom facing toward a window. Following their natural instinct and higher intelligence, the bees--like the pike--struggled repeatedly to reach the light from the window and eventually died trying. The "feather-brained" flies, on the other hand, disregarded the light and ultimately through random efforts succeeded in finding the open end of the bottle--and managed to escape the fate of the bees. (40:108)

The lesson to be learned here is that individual and organizational bias can unintentionally undermine the effectiveness of the change process. Reactions to the changes proposed under AFLOGCON have already produced some notable symptoms of the "invisible barriers" encountered in these experiments. Resistance to change in those instances has slowed progress and delayed development, test, and implementation actions. While a number of ways might be explored to overcome such "negative" coping behavior, it's clear that success in such situations requires open communication, mutual trust, and a willingness to solve problems across organizational boundaries.[53] It goes without saying that high powered support from senior logisticians at all levels of the Air Force will speed the change process. Handpicked assignments of highly talented individuals to critical positions in the field, within the MAJCOM, at Headquarters USAF, with other services and agencies, and similar career broadening opportunities are complementary actions.[54] Such deliberative career paths should take advantage of the natural bonding potential that exists among exceptionally qualified individuals both in the military and civilian sphere of influence. The high calling of duty, honor, and country makes the esprit de corps of the Air Force an ideal source of strength to draw on for this purpose.

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[53] Another key factor appears to be positive reinforcement for a job well done. Behavioral research indicates that "negative reinforcement will produce behavioral change, but often in strange, unpredictable, and undesirable ways. Positive reinforcement causes behavioral change too, but usually in the intended direction." (40:68)

[54] Elimination of stovepipe career patterns for mid and senior management positions, cross-training in multiple functional specialties, and Air Force-wide career broadening programs are considered essential to ensure critical managerial skills are not handicapped from this perspective. The Air Force Logistics Civilian Career Enhancement Program (LCCEP) and Gen O'Loughlin's commitment to making an ALC Vice Commander assignment a prerequisite for appointment as MAJCOM/LG are examples of programs now in place to broaden the experience base of key Air Force logisticians and, in turn, lower the perception "barriers" that could otherwise impede constructive change. (41:12-13)

Milestones

As illustrated in Fig 16, the growth curve associated with implementation of AFLOGCON could vary significantly. How well the Air Force manages the change process is, of course, the key factor that will determine if the proposed concept of operations is institutionalized behind, on, or ahead of schedule. A clear vision of what needs to be done and strong top management commitment at all levels of the Air Force are required to translate the concept into action as quickly as possible. Easier said than done, a clear vision of how the logistics system and its component parts should be structured must be based on an "ideal" that responds to the realities of today's operating environment. In this sense, AFLOGCON is the key to unlocking and unleashing a more defined image of how each component of the logistics system ought to function to achieve "maximum combat capability."

As a criterion for measuring system-wide performance, such an ideal can become a standard benchmark for guiding decisions across the full spectrum of logistics activities. (42:37-38) The external and internal motivational value that can be gained by tying individual decisions and actions to simple and easily understood performance criteria will speed overall implementation of AFLOGCON. It will also put in place a solid frame of reference that provides stability and direction to the change process.[55] The key here is to recognize "the importance of keeping things simple despite overwhelmingly genuine pressures to complicate things." (40:63) While the growing complexity created by advanced technology would appear to

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[55] This process of establishing or refining an "ideal" criterion for judging day-to-day decisions can be related to Freud's concept of man and the conflict between the id, the ego, and the superego. Ideals impact conscious and subconscious thoughts and actions that influence our values and shape our conduct in specific situations. An interesting view of the conflicts that can arise between immediate needs and long-term values is provided in Chapter 2 of Reference 42.

make this an impossible task, AFLOGCON can provide a meaningful common denominator that cuts across all functions of the logistics system. Within that framework, available technology (e.g., high speed data systems, telecommunications, and artificial intelligence) can be focused on automating these complex relationships and supplying simple and effective outputs to support the decision-making process. From this standpoint, "everything we know in psychology about perception, pattern recognition, and awareness of the state of affairs, says that we should try to reach our judgements in terms of relative size and shape, relative colour, relative movement . . . (and) leave the handling of digits where this kind of work belongs: inside the computer." (45:247)

Although the pace and momentum of change can be quickened in this manner, a number of pitfalls could impede progress. The most notable of these involve the people who are selected to spearhead the change process. The problems these people can expect to encounter are aptly described by Machiavelli as follows:

> "It must be considered that there is nothing more difficult to carry out, nor more doubtful of success, nor more dangerous to handle, than to initiate a new order of things. For the reformer has enemies in all those who profit by the old order and only lukewarm defenders in all those who would profit by the new order, this lukewarmness arising partly from fear of their adversaries, who have the laws in their favour; and partly from the incredulity of mankind, who do not truly believe in anything new until they have had actual experience of it. Thus it arises that on every opportunity for attacking the reformer, his opponents do so with the zeal of partisans, the others only defend him half-heartedly, so that between them he runs great danger." (43:21-22)

To avoid or minimize these adverse effects, Machiavelli concluded that the effectiveness of reformers is a function of whether "they have to <u>entreat or compel</u>. In the first case, they invariably succeed ill, and accomplish nothing; but when they can depend on their own strength and are

able to use force, they rarely fail." (Underlining added) Moreover, Machiavelli also noted that "the character of people varies, and it is easy to persuade them of a thing, but difficult to keep them in that persuasion." (43:22)

All of these challenges are compounded by the fact "that, stripped of its ideology, the Air Force is purely and simply an immense bureaucracy--hierarchically organized, intellectually compartmentalized, and by nature of its purpose and tradition, action oriented. Its ability to function effectively is keyed to fast-paced routines--prescribed patterns of activity which allow its myriad functions to take place on a timely, efficient basis." (37:6) This tendency toward immediate results makes it difficult to place sufficient time, effort, and highly skilled talents into conceptual thinking and innovation. If AFLOGCON is to be implemented on the "fast track" depicted in Fig 16, these and other impediments to the change process must be neutralized or eliminated. A key step in that direction is to recognize that conceptual changes to the logistics system may ultimately prove to be the deciding factor in how well we use our dwindling resources to counter the threat.

Actions within AFLC have produced a wealth of experience and a solid foundation for institutionalizing AFLOGCON within the Air Force. Similar but more gingerly steps in this direction have also been taken by the Air Staff. Responsibility for the development of general concepts of operations for the logistics elements of AFLOGCON, for example, have been delegated to the MAJCOMs.[56] This "piecemeal" approach to defining AFLOGCON relationships could prove to be beneficial by drawing on diverse

[56] A general statement of need and concept of operations for the depot element of AFLOGCON is presented in Appendix A. Prepared by the CLOUT Program Office in Feb 88, the proposed concept synopsizes the fundamental changes required at the depot-level to make effective use of available logistics resources under the highly dynamic and uncertain conditions the logistics system must be capable of responding to. (46:1-4)

talents and points of view on what needs to be done. Innovative ideas and competing concepts should yield greater innovation but could also make the sytem-wide integration requirement much more difficult and delay implementation actions. These concepts will be translated into formal action plans in 1988 and guide AFLOGCON development and implementation activities through the mid- and long-term planning horizons well into the twentyfirst century.

PART IV. STRUCTURAL CHANGES AND RESOURCE IMPACT

Introduction

Implementation of the new Air Force logistics concept of operations will require significant structural changes. These changes should be defined and prioritized in terms of specific objectives that must be achieved to bring existing organizational structures, management information systems, policies, and procedures in line with the ideal logistics system prescribed by AFLOGCON.[57] To better understand these basic structural requirements, an in-depth look at logistics operations in the field is required.

At any given point in time, operational units in the field have a finite set of resources to carry out their mission. Under ideal conditions, sufficient resources are in-place to support peacetime training and rapid transition to planned wartime operating programs. The logistics system today is largely structured on the assumption that operational resources required for this purpose can be predicted with reasonable accuracy. Consistent with this assumption, resources are planned, programmed, and distributed to ensure initial and full operational capability at the unit-level. As operational demands draw down unit resources, "pull" actions are initiated to replenish operating stocks. Replenishment requisitions are normally processed to the wholesale source of supply for fill action. Under this approach, management emphasis has traditionally been placed on how effectively the logistics system is responding to replacement requirements. Fill rates for individual items and aggregate commodities are the basic indicators DOD has relied upon to measure the health of the logistics system. New technology now makes it possible to link individual bits and

[57] Such a realignment recognizes that "management improvement is a process of better adapting the operational system for accomplishing defined goals. A good design for an operational system at a given time and in a given situation may be poor at later times and in different situations. For rarely are exactly the same objectives formulated at different times with exactly the same means made available for their achievement." (46:86)

pieces, component parts, test equipment, and other indirect support resources directly to specific weapon systems. Weapon system capability assessment models are routinely used today to determine unit readiness from a much broader perspective of what is required to generate combat sorties. Moreover, model enhancements are continually being introduced to ensure capability assessments and resource requirements are as accurate as possible and are sensitive to critical resource relationships that impact combat capability.

Under AFLOGCON, the logistics system must be capable of effectively relocating critical logistics resources to the highest priorities in the field under peace and wartime conditions. This requires a capability to track key resources at all levels of the system, to identify and relate critical resource shortfalls to weapon system availability goals, and to physically move available resources to those operational units that can provide the highest return in combat capability at any given point in time. The dynamic nature of peacetime demands coupled with the highly uncertain wartime environment dictates that the logistic system be flexible, survivable, and highly responsive to immediate changes at the operating level. Maintaining continuity of operations in the face of these uncertainties and extracting the most combat capability from the existing set of resources available to operational forces are two of the primary objectives that must be achieved. A survivable resource balancing mechanism is required for this purpose.

The need for such a resource balancing mechanism and the basic elements that are required to make it work are illustrated in Fig 35 to set the stage for the systemic changes envisioned under AFLOGCON. Using sorties as a measure of combat capability, in-place resources for each squadron can be evaluated in terms of actual sortie capability at each operating location.

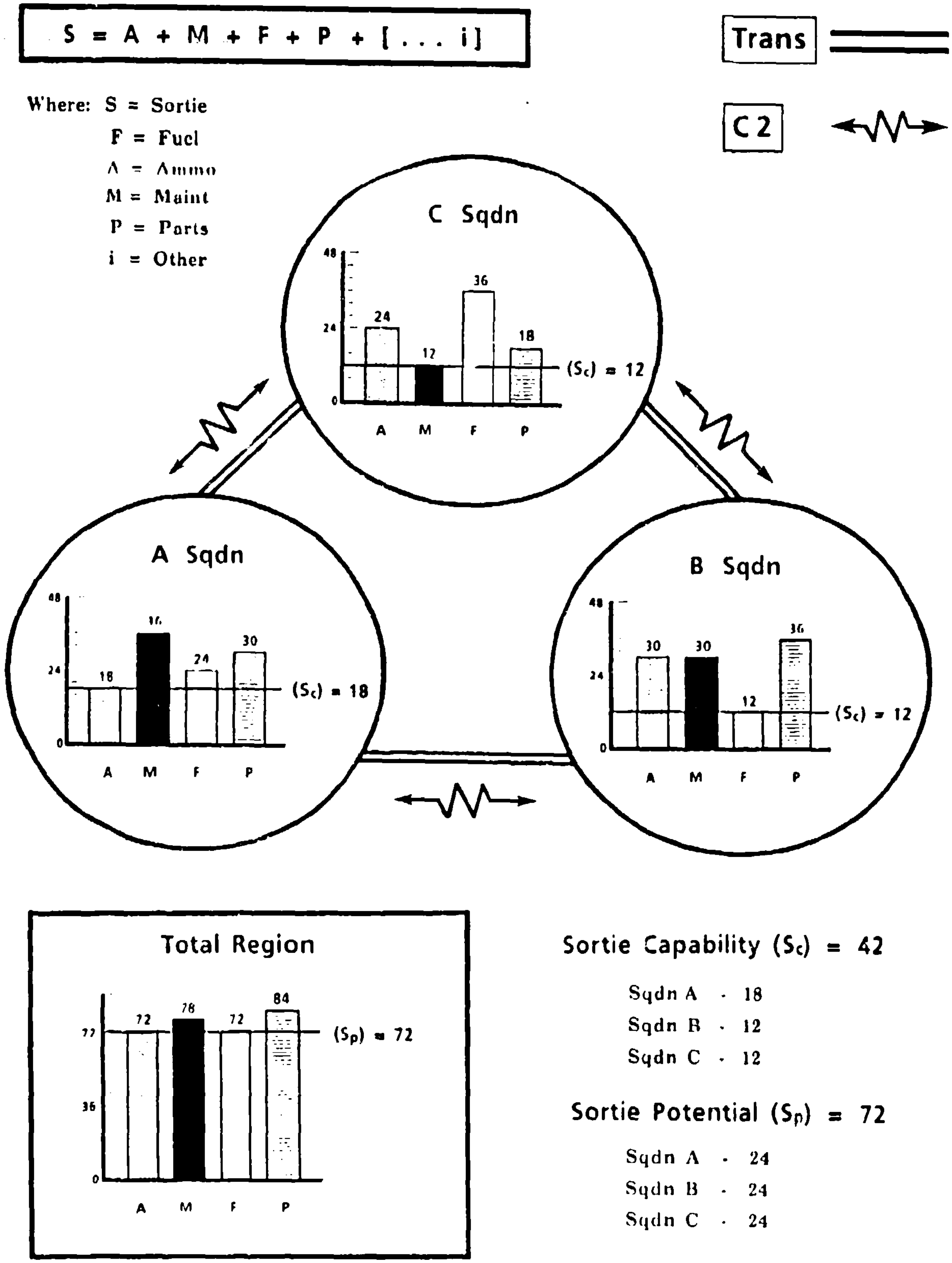

Fig 35. Unit Versus Regional Sortie Capability Under AFLOGCON.

In the example provided, it is assumed that a sortie can be generated if one unit of fuel, ammo, maintenance (in manhours), and parts is available to the squadron. This is done to convey the basic logic involved without getting tangled up in the mathematical complexities associated with actual resource relationships.[58] Given this linear relationship, the resources allocated with each squadron can be translated into unit-specific sortie capabilities. In this case, squadron B and C can fly 12 sorties each and squadron A can fly 18. In considering the total resources available in the region, however, the potential exists to increase sortie capability from 42 to 72 sorties. This potential can be achieved by taking the redistribution actions identified in Fig 36.

$$\boxed{S = A + M + F + P + [\ldots i]}$$

Where: S = Sortie
F = Fuel
A = Ammo
M = Maint
P = Parts
i = Other

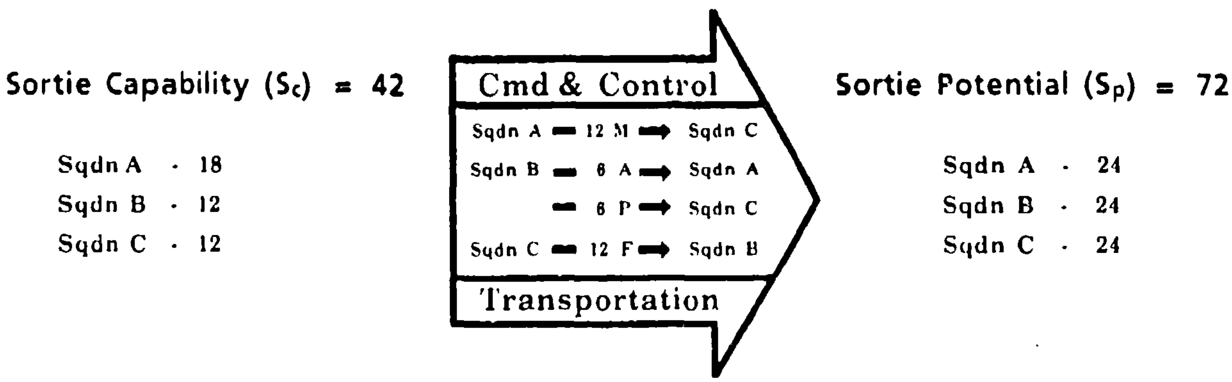

Fig 36. Redistribution Actions To Achieve Regional Sortie Potential.

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[58] In real life, the availability of other resources (e.g., SE, ATE, AIS, etc.) must be factored in. Current and planned capability assessment/resource allocation models, such as WSMIS, DRIVE, and AFCAP (Air Force Capability Assessment Program), use actual or estimated demand factors,

These illustrations attempt to highlight that a resource balancing mechanism can result in tremendous improvements to sortie capability when resource constraints are a factor. The full potential of such a mechanism as a force multiplier can not be realized, however, without an effective logistics C2 system and the necessary transportation capability to move critical resources to the point of greatest need. Moreover, as the complexity of these resource relationships increases a greater requirement exists to automate the weapon system capability and resource allocation processes. The growing complexity of the Air Force force structure, its ripple effect on the infrastructure, and state-of-the-art advances in logistics technology have already produced a solid nucleus for developing standard regional and worldwide decision-making tools that can deal with this requirement. The emphasis on R&M 2000 is already showing signs of reversing this growth in weapon and support system complexity. Those actions should make the weapon system assessment and resource allocation process less difficult over the long run. It will not, however, eliminate the need for a dynamic resource allocation mechanism that can effectively respond to internal and external changes to the logistics environment.

Command and Control (C2)

Air Force command and control systems are primarily geared to the worldwide military command and control system (WWMCCS) [59] which provides the

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[58] (Con't) weapon and support system interrelationships, and simulation techniques to determine resource flows over the near-term operating horizon. Macro allocation models, such as TSAR, LCOM, and TSARINA, also consider availability of base facilities, runway capacity, etc.

[59] Automated data processing resources for WWMCCS are used in conjunction with standard AF systems, such as the Joint Operational Planning System (JOPS) and Joint Deployment System (JDS)--which will be replaced by the Joint Operational Planning and Execution System (JOPES), UNITREP, the Combat Ammunition System (CAS), the Combat Fuel Management System (CFMS),

necessary communication-computer connectivity to support command and control of operational forces by the National Command Authority (NCA). In the process of being upgraded under the WWMCCS Information System (WIS) program, this system will provide rapid and secure exchange of information, both horizontally and vertically, within AFLC and across service, command, and agency boundaries. Through a combination of local area networks (LAN), hardwire land lines, and satellite links, WIS will apply the latest technology and use the Defense Data Network (DDN) to meet national C2 requirements. Standard Air Force data systems and command unique C2 systems will be supported by WIS resources. [60]

While WIS will upgrade the backbone for worldwide command and control of operational forces and their critical logistics support resources, the Air Force has recognized that there is presently "no Air Force-wide concept of LOG C2 that provides guidance for the full spectrum of operations from peace to war and also provides decision-working information from the lowest echelon up to the National Command Authorities." (49:1) The Air Force LOG C2 Tiger team is addressing this need and a four-phased approach has been adopted to define LOG C2 related mission responsibilities, and organizational decision-making processes (Phase I); determine minimum essential

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[59] (Con't) the Contingency Operation Mobility Planning and Execution System (COMPES), and WSMIS. Acquired in the early 1970s, WWMCCS is rapidly becoming obsolete and increasingly uneconomical to maintain and operate. WWMCCS modernization is underway to eliminate these deficiencies and make the system more time-sensitive to immediate operational requirements. (47:1)

[60] WIS implementation has been delayed by two years. This delay is partially due to funding cuts attributed to the fact that the "armed services failed to support the WIS program when it was first established, creating doubt in Congress over whether it would succeed" and technical problems encountered early in the program. Greater service support has been achieved recently by shifting development emphasis from a "software-first" approach to an "user interface-first" approach. The lessons learned from this indicate that "program managers can lose sight of their objectives when they try to procure the latest technology rather than concentrate on how the system will satisfy user requirements." (48:1,101)

information requirements at all levels (Phase II); develop a broad concept of operations (Phase III), and establish an action plan to achieve near-, mid-, and long-term objectives.[61]

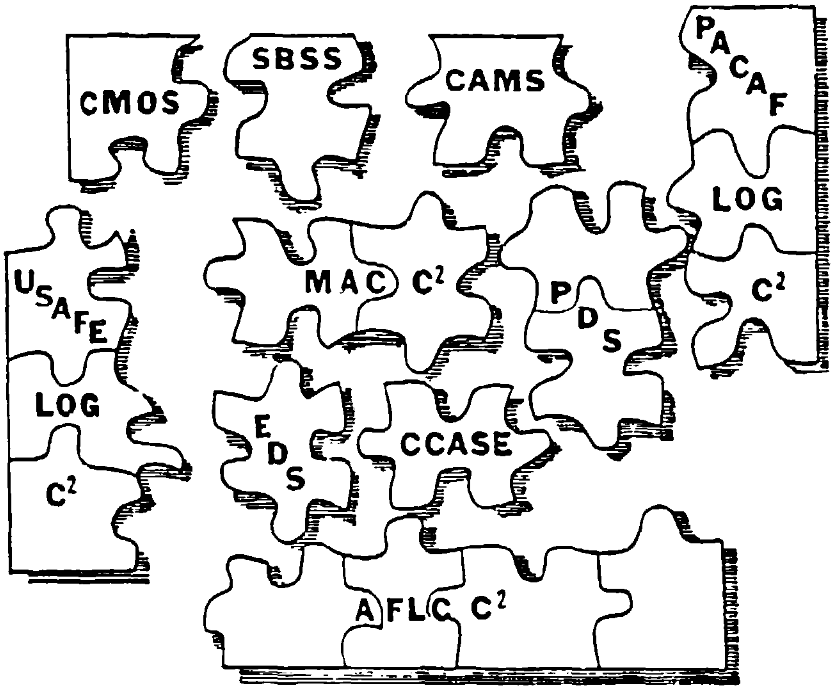

Fig 37. The Logistics C2 Challenge. (49:6)

As illustrated in Fig 37, the Tiger Team will attempt to integrate the many diverse and fragmented C2 capabilities that exist today into a cohesive Air Force-wide system that can " measure the overall ability of LOG C2 to sustain operations . . . and provide timely logistics feasibility assessments of combat objectives." (50:1) As an analytical element of the resource balancing mechanism the Air Force needs to achieve maximum combat capability, LOG C2 must be structured to support the overall Air Force

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[61] Tiger Team status was briefed during FUTURE LOOK 88. The team is now in the final stages of Phase II and a draft LOG C2 concept of operations is scheduled for tiger team review in mid-Mar 88. (50:A7)

logistics concept of operations. Within that framework, it is clear that critical information needs can be directly limited to the input and output requirements that support logistics status assessments at the unit, region, and depot-level. Information flows into operational support and logistics readiness centers (OSC/LRC) can be determined on the same basis. The source of critical information used in the resource allocation/execution process must be pinpointed to the logistics support functions that generate this information at fixed and deployed locations. Once captured, secure computer/communications capabilities are required to physically move and translate this data into usable output products for real-time resource allocations and execution decisions at the lowest possible level. In this context, lateral supply support or mutual repair between units in the immediate area of combat operations should be undertaken to reduce resupply delays as much as possible.[62] As critical shortfalls become apparent or actually deplete in-theater resources, replenishment action should be initiated at the depot to maintain continuity of operations. These inter-dependent relationships must be established to support peacetime training and be maintained as the force transitions to combat operations.

Under the existing logistics concept of operations normal supply actions are interrupted for up to 30 days until the turbulence created by force deployment and employment has stabilized. This "quick disconnect," coupled with almost total reliance on prepositioned WRM during the initial period of war, has produced a requirements "void" that is largely responsible for

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[62] In recognition that current war scenarios are more dynamic and sophisticated than those of the past and require fast-moving, responsive logistics support, "AFLC initiated actions in 1984 to implement the PACER CRESCENT concept. Under this concept, "all AFLC overseas activities, including maintenance, acquisition, and distribution" operations are guided by a total worldwide strategy for in-theater logistics support that selectively utilizes the potential sanctuary offered by the "crescent" rear-areas of the planned battlefield (52:1). Specific capabilities AFLC has established in overseas theaters to improve operational support are detailed in Reference 52.

the C2 problems that plague operational forces today. While some efforts have been made in recent years to improve the C2 capability of deploying units, the primary emphasis has been on re-establishing and phasing in critical supply functions at the end of the prepositioning period. The development of Combat Communications Access for Support Elements (CCASE), formerly designated , the Assured Logistics Communication program, and TAC's Follow-on Support Kit (FOSK) concept are examples of this. [63] Given that standard base supply, maintenance, and other management information systems are not the mainstay of deploying forces, it should not come as a big surprise that they are largely designed to ensure efficient peacetime operations. For the same reasons, today's logistics communication system is cumbersome, time consuming, and highly prone to clogging at critical chokepoints. Transfer of requisition data from the SBSS to the base telecommunication center, for example, takes about three hours and passes today from an overseas base through one of four Automated Digital Information Network (AUTODIN) switches in the Pacific or three switches in Europe to the Defense Automatic Addressing System (DAAS) switch at Gentile AS, Ohio, before being routed to the appropriate source of supply for action. The low number of fixed bases in-theater and the limited switching capability makes the system highly vulnerable to disruption under hostile conditions. [64] Although improvements are expected with implementation of DDN and the Defense Communication System (DCS), joint service, contractor,

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[63] CCASE will apply technology that enhances access to all available communication modes for transmission of logistics data from wartime locations. FOSK ensures that the residual supplies left behind by deploying units at their home station are eventually married up with the unit when RRR maintenance actions are resumed at the deployed location.

[64] In wartime, the flow of data pattern supply requisitions through AUTODIN from base supply organizations in overseas theaters will be crowded severely or cease entirely. This is attributed to "the fact that the maximum AUTODIN precedence currently authorized for supply requisitions is PRIORITY. In exercises or crisis situations, the AUTODIN system is flooded with IMMEDIATE narrative messages causing lower precedence messages to be held at the AUTODIN Switching Center (ASC) until the flow slows to allow PRIORITY messages to be reintroduced into the system." Changes to Defense

and FMS reliance could easily degrade system availability in a combat environment. (53:1)

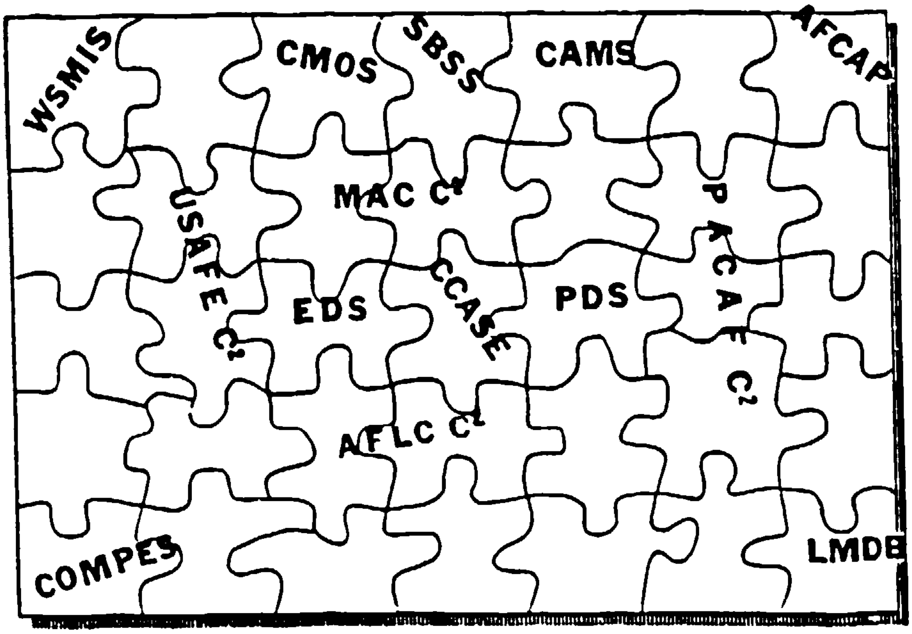

Fig 38. Proposed Solution for Logistics C2. (49:12)

To correct these system deficiencies, action must focus on defining what must be done to modify existing and planned management information systems, policies and procedures, and organizational structures to ensure continuity of operations as defined by AFLOGCON. The key to success here, however, rests on the recognition that the problem is not just a matter of finding the best way to integrate on-going C2 initiatives as illustrated in Fig 38. Instead, it must be recognized that the fundamental problem is the built in

64 (Con't) Communication Agency (DCA) directives are required to allow critical supply requisitions (priority 01-03 and MICAPs) to be processed with an IMMEDIATE communication precedence. (53:4) On the average, two million requisitions (Air Force - 34 percent, Army - 41 percent, Navy - 13 percent, Other - 12 percent) are transmitted daily via PRIORITY and ROUTINE communications precedences.

discontinuity of vital logistics support functions during the transition from peace to wartime operations. Existing systems and processes must be revised or augmented with additional capability to provide every assurance possible that critical logistics support functions will continue to be available during this period with minimum disruption. Greater survivability through hardened facilities, planned redundancy, and rapid transition to high priority, minimum essential processing of critical information at the unit, in the theater or region, and at the depot will be required. Alternative ways to eliminate peacetime dependencies on fixed installations and vulnerable hardware/software, such as the Phase IV computer, should be explored. Greater integration of critical data bases, standard automated data processing (ADP) capabilities, and more flexible, responsive, and survivable system interfaces will complement these actions.

All of these efforts should be keyed to the minimum essential information the combat commander and supporting decision-makers must have to allocate available resources to the highest operational priorities in effect at any given point in time. Resource allocation/execution models, such as DRIVE, ELCAM, WSMIS, and TSARINA, hold great promise of providing "full up" weapon system capability assessments and real-time decision tools that the battlefield commander and his staff can use to evaluate and select the most effective operational strategies and tactics. The development of a standard resource allocation/execution model for this purpose should reduce the overall data processing requirements of the logistics system and help focus efforts to define the minimum essential information that must be available for effective command and control of combat support forces.

Interim steps to achieve such a capability should build on present C2 support systems that are designed for continuous operations during the peace to war transition period. Widely recognized as a leader in this

field, MAC and it's strategic airlift mission demand flexible, responsive, mobile, survivable, and robust C2 systems to meet the tremendous transportation needs of U.S. force deployment during the shift from peace to war. Operating under the slogan "first in and last out," MAC transporters fly peacetime sorties whose profile remains essentially the same in war. Strategic airlift missions, for example, are scheduled out of CONUS home stations and routed to pick up and delivery points through a network of route structures that ultimately return aircraft and flight crews to their original operating base. Through en-route mission support kits and stockage of key supplies and materiel at forward operating locations, aircraft maintenance actions are carried out as required at key points of the flight plan. This continuous closed-loop or round robin concept of operations remains in effect during the mobilization, deployment, and force engagement phases of crisis, contingency, and wartime operations. To meet the accelerated flying programs and programmed changes in route structure that support the Time Phased Force Deployment List (TPFDL) for each wartime operations plan, MAC is authorized prepositioned WRM. Although these stocks are classified as WRSK, their primary purpose is not to support deployment of the MAC unit but rather to provide the additional spares that are expected to be consumed along all points of the wartime route structure as the pace and tempo of airlift operations are accelerated to support massive movement of forces and their equipment and supplies to the combat theater.

Because of the similarities between MAC's peacetime and wartime missions, the essential operating requirements and concept of operations remain unchanged despite the more demanding wartime environment. This built in continuity is particularly important because of the logistics system's heavy reliance on day-to-day movement of peacetime supplies. From this perspective, MAC's C2 systems would appear to provide a ready made command

and control structure that can be tailored to meet the needs of other strategic and tactical units, especially those that require logistics support during deployment and employment in the theater of operation.

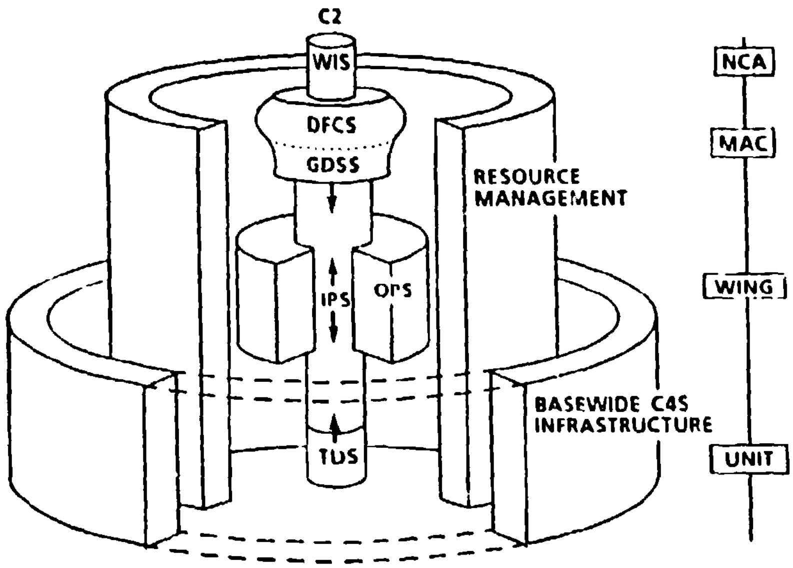

Fig 39. MAC's C4 Systems Model. (54:1-1)

Illustrated in Fig 39, MAC's command and control lies at the core of its command, control, communications, and computer (C4) systems.[65] Critical to that structure is the connectivity WIS provides to the National Command Authority. Other essential systems relay user requests, match requirements to capabilities, and provide communication channels to direct operations. Aircrew mission planning data and logistics information required to generate mission ready aircraft are provided by operations C4 systems that

are centered at the wing and support launch of individual missions at the unit level.

Efforts to better integrate that capability and to make it more robust and survivable in response to the wartime theater are drawing on available technology and influencing the direction of related research and development programs. The Air Force C2 concept of operations can provide a solid frame of reference to guide such command unique C2 development activities and complement those actions by focusing top management emphasis on the need for parallel development of Air Force-wide standard C2 data elements, system interfaces, and control mechanisms. Such a standard C2 system must provide all deploying and in place forces the capability to effectively deal with the potential discontinuities in LOG C2 during the critical initial period or war.

An essential element of a standard LOG C2 system is a uniform priority allocation technique that provides the CINCs of combat forces with a reliable means for translating dynamic changes in battlefield conditions into specific unit priorities. Those priorities should be consistent with the relatively stable FAD structure of UMMIPS yet subject to override and rapid readjustment in response to changing circumstances. Through the C2 process, these priorities become the primary basis for reallocating available logistics resources at the unit level, within the theater or CONUS region, and at the depots. As the common denominator for resource balancing actions at all levels of the logistics system, a standard prioritization scheme must be flexible enough to accommodate unique requirements in-theater yet support prioritization actions that impact logistics support to CONUS forces and multiple theaters of operations. AFLC's C2 system must interface with the standard C2 data elements to ensure follow-on support actions at the depot level are effectively dove-tailed with worldwide

operations. As logistics resources are consumed by peace and wartime activities, redistribution across theaters, reconstitution and replenishment, and expedited shipment of critical supplies and materials to the points of highest need will be required to achieve and sustain maximum combat capability. To fully utilize critical logistics resources that can be made available to the combatant CINCs, AFLC must be actively involved. Logistics assessments of planned operations for example, require AFLC input when friendly orders of battle clearly exceed the logistics resources available in theater. [66]

AFLC's Logistics Operations Center presently provides a centralized control point for evaluating war plans and ensuring that all vital AFLC activities are effectively coordinated and carried out in support of peace and wartime operations. Integration of item and system program management functions as well as overall execution of the Command's massive depot maintenance, distribution, and acquisition operations are monitored by the LOC through dedicated liaison interfaces with other logistics agencies and the using commands. The diverse information elements required to accomplish these functions in peace and war were catalogued in December 1986 in an effort to define a LOG C2 concept of operation that would meet the needs of the AFLC Commander, his subordinate commanders, and JOPES. Moreover, it was recognized that in order to "support JOPES information and the internal

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[66] AFLC's LOG C3I requirements were submitted to HQ USAF in 1982. Although the Electronics Systems Division (ESD) established a program to develop this capability in 1984, the LMSC chartered a LMS Program Integration Office (PIO) for LOG C3I and assumed selected program management responsibilities in 1985. (55:1) ESD phased out all related C2 development activities in Jul 87, with transfer of program management responsibility for the Battle Staff Management System (BSMS) to AFLC. Lack of funding for LOG C3I in FY 87 forced AFLC to restructure its C2 program into three basic elements: AFLC WIS, BSMS, and WSMIS. The scope of the LOG C3I program and the lack of defined data flows for critical C2 information into, within, and out of AFLC appear to have been the deciding factors in deferring more comprehensive C2 development actions. More details on AFLC's broad C2 requirements are contained in References 55 and 57.

AFLC C2 information needs, the Command must develop the capability to make centralized C2 decisions while maintaining decentralized operations." Operational information related to combat intensity, losses, and planned and actual consumption of logistics resources is to be passed to the logistics commands by JOPES to support the LOG C2 process.[67] (58:11)

Drawing on that source of information, AFLC must "develop a responsive and flexible logistics information system to ensure effective management of logistics resources in war." (59:E-8) Current efforts to establish such a capability are focused on translating AFLC's broad wartime functions, processes, and data flows into specific system requirements using advanced information engineering techniques. AFLC is working with the Department of Transportation's Transportation System Center (TSC) to define these requirements in terms of system input, output, and interconnectivity with the objective of implementing a "capability to collect, process, transmit, and display logistics data in suitable format to permit timely decisions, actions, and reaction." (59:E-8) Complementary actions are also under way to define a practical concept of operations for AFLC C2 that will make maximum use of existing data systems, capability assessment techniques, and available resources until the long-term C2 strategy is defined and implemented.

Near-term improvements to AFLC's C2 capability should build on the well-thought out conceptual foundation upon which the original LOG C3I statement of need was based. This foundation was heavily influenced by cybernetic

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[67] The AFLC C2 concept of operations acknowledged that prior attempts to define the Commmand's C2 requirements were undertaken in a vacuum without adequate recognition that "AFLC is a part in the continuum of JOPES" and that all members of the joint deployment community (JDC) including AFLC and its subordinate units, are part of WWMCCS. Working AFLC's C2 requirements in a vacuum was viewed as "not only erroneous but could result in non-funding of requirements and more importantly, failure to integrate with the JDC when required systems are funded and developed. (58:1-1)

principles that govern complex systems and their ability to survive in a hostile and ever-changing external environment.[68] Cybernetic theory and the study of living systems provide an excellent body of knowledge on the nature of complex control processes that govern animate and inanimate systems. Man's ability to rapidly shift from normal day-to-day activities to a "flight or fight" posture when danger threatens requires countless C2 decisions and integrated action across all bodily functions. In this context, the brain "has more potential states then can ever be analysed or examined by an enormous factor--an unthinkably large factor. Information, then has to be thrown away by the billion bits all the time, and without making nonsense of control." (61:65) Cybernetics explores how these processes are carried out under the premise that "there are natural laws governing the behavior of large interactive systems in the flesh, in the metal, in the social and economic fabric. These laws have to do with self-regulation and self-organization. They constitute the 'management principle' by which systems grow and are stable, learn, and adjust, adapt and evolve. These seemingly diverse systems are one, in cybernetic eyes, because they manifest viable behavior--which is to say behavior conducive to survival." (45:221) The immense scope of AFLC planning and execution actions and the integrative function a LOG C2 system must provide to ensure internal connectivity and effective response to external demands are illustrated in Figures 40 and 41.

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[68] The term cybernetics is derived from the Greek word **kybernan** which means to govern. Cybernetics is the science of control and self-regulation in machines and living organisms. A system's ability to remain viable and survive in its environment is achieved through coordinating activities that do not unduly constrain its component parts by leaving room for variation and flexibility. It is "this flexibility that enables living organisms to adapt to new circumstances." (60:268) Further background on AFLC research involving the application of cybernetics theory to logistics C2 is provided in References 63 thru 67. A list of selected findings that are particularly germane to the structural changes envisioned under AFLOGCON are provided in Appendix B to illustrate the potential value of this esoteric field of study.

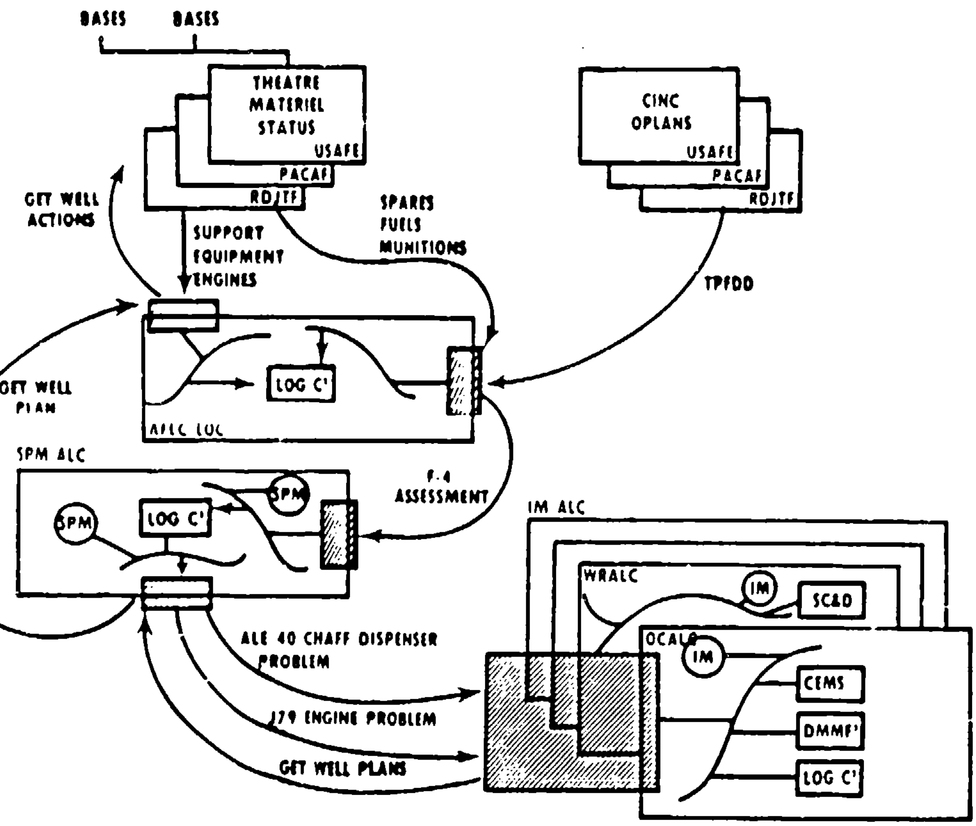

Fig 40. Logistics C3 Planning Activities. (62:30)

Secure intra- and inter-command gateways for passing critical information between key decision makers will be provided by existing and planned upgrades to local area networks that interface with WWMCCS. While that framework is without question the conduit for transmitting logistics information within the logistics system, the minimum essential information required for effective planning and execution of wartime logistics support actions has not as yet been defined. Moreover, efforts to identify critical information needs have largely relied on surveys that put emphasis on individual data elements rather than the collective sets of critical information needs that must be available for effective wartime decision

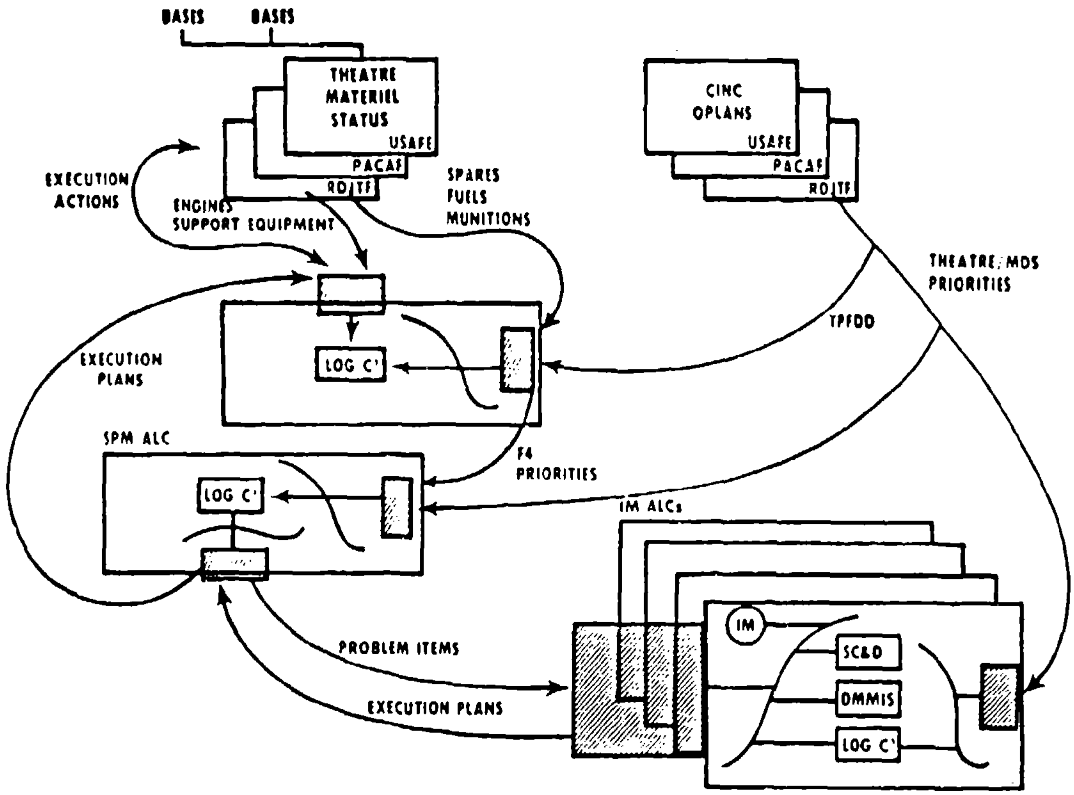

Fig 41. Logistics C3 Execution Activities. (62:32)

making. Standard information sets for this purpose are beginning to emerge as the minimum input requirements for dynamic resource balancing mechanisms, such as DRIVE, TSAR, LCOM, and WSMIS, take shape. The application of artificial intelligence (AI) and expert systems to automated processing of this information will make it possible to avoid the information overloads and decision-support breakdowns that threaten today's wartime C2 processes. Solutions to this problem should focus on a general, heuristic approach rather than a finite prescription for the ideal decision making tool. Developing such a capability is iterative in nature and akin to the evolution of birds from reptiles. "Did a representative body

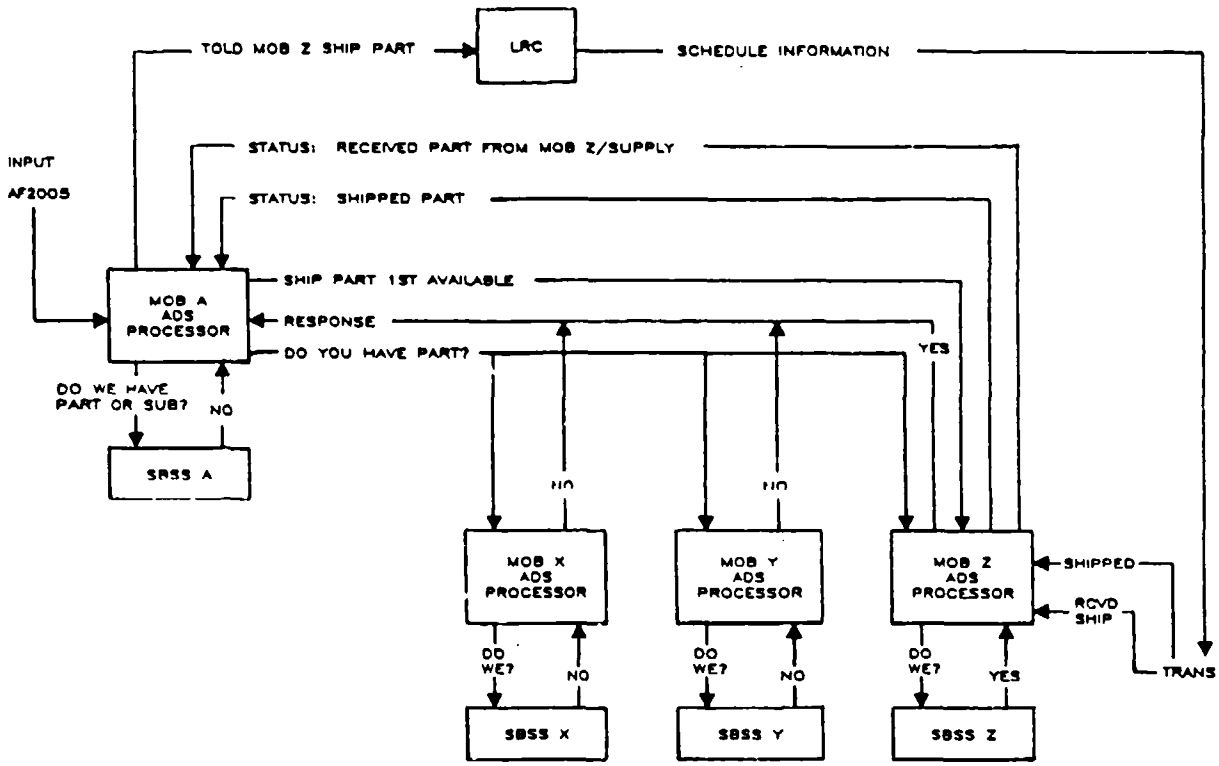

Fig 42. ADS Logistics C3 Concept of Operations.

of lizards pass a resolution to learn to fly? If so, by what means could the lizards have organized their genetic variety to grow wings? One has only to say such things to recognize them as ridiculous--but birds are flying this evening outside my window. This is because heuristics work while we are still sucking the pencil which would like to prescribe an algorithm." (61:70) [69]

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[69] The distinction between heuristics and algorithms is "very important in cybernetics, for in dealing with unthinkable systems it is normally impossible to give full specification of a goal . . . But it is not usually too difficult to prescribe a class of goals, so that moving in some general direction will leave you better off (by some definite criterion) than you were before." (61:69) In this context, specific models and algorithms provide stepping stones toward expanding automated resource allocation and execution processes beyond critical spares to a "full up " capability that considers all critical wartime support resources, including fuel, maintenance, SE, food, medical supplies, etc.

Other near-team C2 initiatives should build on the LOG C3 networks now being developed for the European and Pacific theaters of operation by the LMSC's Assured Distribution System (ADS) SPO. The connectivity provided by EDS and PDS to operational units and regional mission support center's in their respective areas of responsibility (AOR) is a solid first step toward institutionalizing AFLOGCON. [70]

Illustrated in Fig 42, the ADS LOG C3 concept of operations establishes the basis for fully integrating logistics support across MOBs, deployed sites, and LRCs. Geared primarily to redistribution of critical MICAP items in-theater, this capability interfaces with the retail and wholesale elements of the SBSS to identify asset status at all operating sites. Via the central processing capability of the Plexus 60 microcomputer, the location of critical parts is pinpointed, redistribution is directed, and the LRC is notified of the transportation requirement. The system architecture established to achieve this capability for EDS is shown in Fig 43.

EDS, as the forerunner of PDS, has generated a number of enhancements to the ADS concept of operations that are being implemented in the Pacific. The most significant of these involves the establishment of a theater asset visibility backup capability that will be maintained by PACAF's Resource Management Center (RMC). Collocated with the LRC at Kadena, the RMC is linked with all theater operating locations to keep the backup data base current. In the event the primary data base is disrupted or destroyed, the backup data base can be put on-line to maintain continuity of operations.

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[70] General Billy Minter, CINC USAFE, initiated action in the early 1980's to provide USAFE the capability for assured distribution of critical assets in support of war and peacetime TACAIR and other critical operations in the European theater. In addition to LOG C3, EDS includes small "off-the-shelf" cargo aircraft capable of moving critical parts and selected fighter aircraft engines within the region and provides for forward stockage of wholesale (AFLC and DLA) spares deployed in Europe to offset expected wartime collateral airbase damage. This capability supports NATO's strategy of flexible response and is expected to yield 300-800 additional TACAIR wartime sorties. (70:2,3)

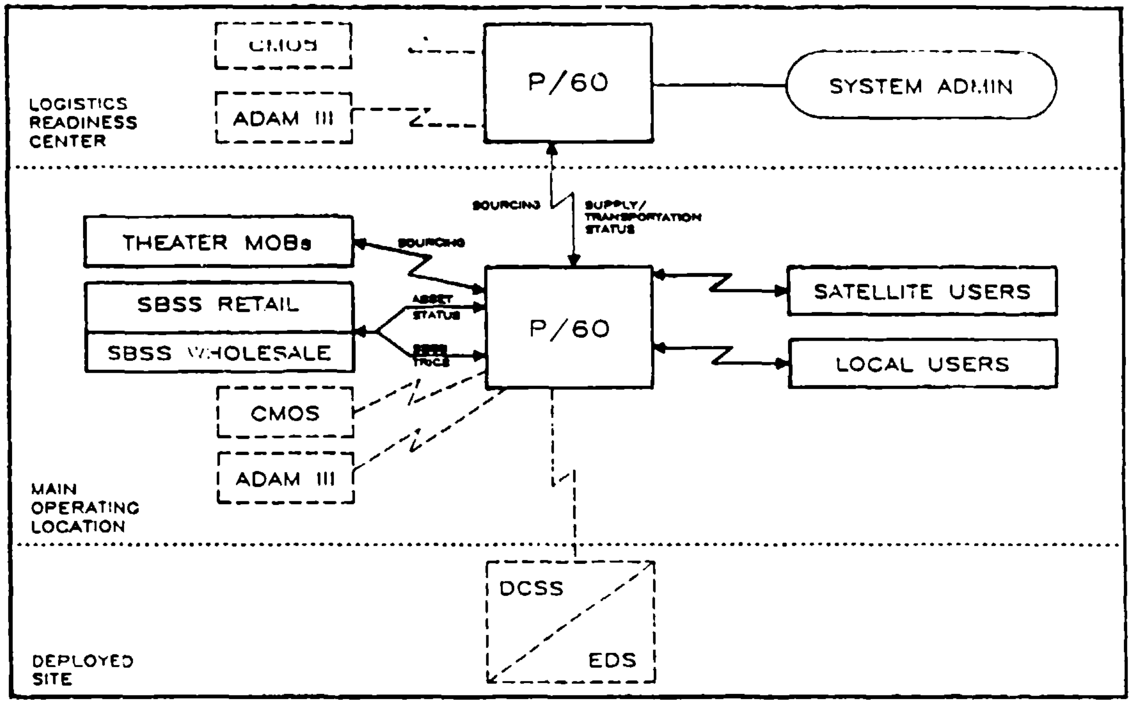

Fig 43. EDS Logistics C3 System Architecture.

Moreover even with combat loss of the RMC, a theater-wide asset data base can be regenerated at any one of the operating locations in relatively short order using data inputs from the remaining sites. In addition to the support provided to fixed sites, PDS will provide a deployable LOG C3 capability that is compatible with the Transportable Supply System (TSS). [71]

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[71] The TSS is a mobile van that houses a transportable Sperry 1100/60 Phase IV computer. Five TSSs are presently available to support planned deployments in the Pacific theater. The TSS provides the equivalent SBSS support obtained from a fixed Phase IV computer at peacetime MOBs.

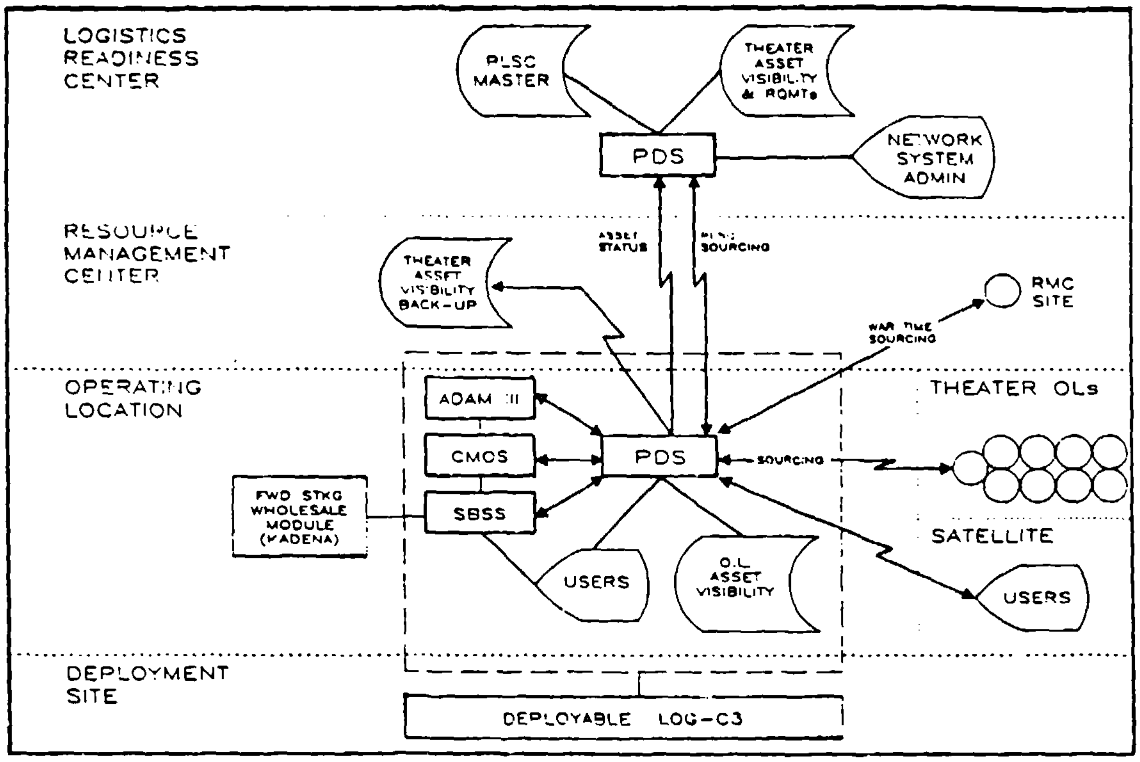

Fig 44. PDS Logistics C3 System Architecture.

Illustrated in Fig 44, the LOG C3 architecture for PDS provides an excellent baseline for the standard regional command and control networks that are required under AFLOGCON. Hardened facilities and equipment, redundant system components, and a high degree of survivability through rapid regeneration of system-wide information are critical elements of the future LOG C2 system that are well within reach under the broad ADS concept of operations.

To fully use the C2 connectivity presently available at the depots and in-theater, advanced resource allocation and execution capabilities must be

developed, tested, and inserted into regional, theater, and depot command and control centers. AFLC is in the process of defining the changes required to insert DRIVE into its LMS architecture and is working closely with TAC to ensure development and test of a prototype production system that will meet operational requirements.[72] Expansion of DRIVE to other weapon systems and commodities (e.g., spare engines, fuel, TRAP, munitions, chaff, flares, etc.) should be coordinated and integrated with other Air Force programs and initiatives to improve resource capability assessments and related resource allocation decision-tools. Moreover, those actions should be closely coupled with RAND's on-going research on combat support C3 (CSC3). This initiative complements the Air Force LOG C2 Tiger Team efforts by looking beyond implementation of changes to current C2 systems by 1995. RAND's long-range goal for CSC3 is to enhance the combat capability of USAF tactical air forces by increasing combat support decision makers' ability to coordinate their resources and activities; by increasing the combat support system's responsiveness to unanticipated operational needs, and by increasing the system's ability to support a wider range of operational deployment and employment options." (72:1) Over the next three years, RAND plans to establish a Combat Support Laboratory (CSL); identify critical operational measures for combat support; examine alternative theater CSC3 system designs; develop and test base, regional/theater, and worldwide decision aids, and test apply prototype decision aids in AFLC and theater command post exercises. (71:10) The

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[72] Col Don Hamilton, Director of the CLOUT Program Office, briefed the status of DRIVE development activities within AFLC to FUTURE LOOK 88. Gen McDonald, AF/LE, and Gen Bracken, AF/LEX, reacted favorably to the progress experienced with DRIVE, and pledged Air Staff support of future efforts to expand DRIVE to other weapon systems if improvements in expected aircraft availability warrant such action. The preliminary DRIVE concept of operations makes DRIVE an intermediate process that links the requirements process (D041) with the depot repair (D073/DMMIS) and distribution (D035/SC&D) processes to identify and direct resource allocation actions that optimize operational aircraft availability. (71:1)

ultimate outcome of this effort is expected to yield a CSC3 system design that can serve as the basis for command and control in the 21st century. The thrust of RAND's concept is to establish a hierarchical network of C2 activities that responds to critical resource shortfalls at each level of the system (e.g., unit, base, region, and depot) by reallocating available resources to the highest operational priorities and referring requirements to the next higher level on an exception-reporting basis. Through real-time simulation, the existing logistics capability will be assessed at each level of the CSC3 system in terms of specific mission support requirements. These assessments will provide a basis for determining if key resources must be reallocated to support planned missions or whether revisions to operations orders are warranted to overcome logistics constraints. (71:7)

Unit Priorities

Operational priorities that govern resource allocation decisions within DOD are established through the Uniform Materiel Movement and Issue Priority System (UMMIPS).[73] The USAF Priority System implements UMMIPS within the Air Force and translates its five broad categories of Force Activity Designators into a set of finite precedence ratings that make it possible to rank requirements for specific programs, units, and activities into 135 priority categories. Operational units today requisition supplies and material based on their assigned FAD, precedence rating, and urgency of

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73 General guidance for ranking materiel requirements, determining a unit's mission importance and the urgency of need for materiel, and incremental time standards for requisition processing and materiel movement during peacetime and in war is provided in DOD Directive 4410.6. Current policy requires that "all echelons of logistics management shall share the responsibility for maintenance of an effective and credible priority system "that is consistent with UMMIPS criteria . . . materiel shall be furnished to users on time, subject to constraints of resources and capabilities." (74:1,2)

<table>
<tr><th colspan="3">DOD UMMIPS</th><th rowspan="2">USAF PREC RATINGS</th><th rowspan="2">PRIORITY INDEX</th><th colspan="2">SYSTEM ESSENTIALITY</th></tr>
<tr><th colspan="2">FORCE READINESS CRITERIA</th><th>FADS</th><th>GROUPS</th><th>LSP RANGES</th></tr>
<tr><td colspan="2">BRICKBAT OR DESIGNATED BY SECRETARY OF DEFENSE</td><td>I</td><td>1-01 thru 1-05</td><td>1.00 thru 1.80</td><td>1</td><td>1.00 thru 1.99</td></tr>
<tr><td rowspan="5">COMBAT AND COMBAT SUPPORT READY</td><td rowspan="3">COMBAT, FORWARD DEPLOYED AND D + 1</td><td rowspan="3">II</td><td rowspan="3">2-01 thru 2-10</td><td rowspan="3">2.00 thru 2.90</td><td>2</td><td>2.00 thru 2.39</td></tr>
<tr><td>3</td><td>2.40 thru 2.69</td></tr>
<tr><td>4</td><td>2.70 thru 2.99</td></tr>
<tr><td>D + 30</td><td>III</td><td>3-01 thru 3-10</td><td>3.00 thru 3.90</td><td>5</td><td>3.00 thru 3.99</td></tr>
<tr><td>D + 90</td><td>IV</td><td>4-01 thru 4-10</td><td>4.00 thru 4.90</td><td rowspan="2">6</td><td rowspan="2">4.00 thru 5.99</td></tr>
<tr><td colspan="2">REAR ECHELON</td><td>V</td><td>5-01 thru 5-10</td><td>5.00 thru 5.90</td></tr>
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Fig 45. DOD and Air Force Priority System Relationships. (75:11)

need as illustrated in Fig 45. Specific precedences are identified on a time phased basis in the USAF Bases, Units, and Priorities Document (PD). Within this broad framework of reference, the Air Force has recognized resource competition as a fact of life that can adversely affect valid requirements. To ensure shifting priorities are dealt with as effectively as possible and that valid requirements are not "lost in the shuffle," the Air Force Priority System is "only one of the tools Air Force leaders must use to make sure mission commitments can be met in this era of limited resources." In this context, Air Force precedence ratings "are not designed to provide the detailed priorities to satisfy resource competition. Functional users must further define those elements which will meet these priorities by developing local priority allocation schemes

and making local management decisions based on current mission status or needs." (76:1)

This acknowledgment that UMMIPS provides only a cornerstone upon which more detailed operational priorities should be based addresses the operational realities Air Force decision-makers must face in dealing with the day-to-day changes that are encountered at all levels of the logistics system. While UMMIPS will continue to provide a sound basis for making macro-level resource decisions involving trade-offs between and among force and infrastructure activities, a more responsive priority scheme is needed to support operational decisions on a real-time basis.

This need for a more discriminating priority allocation process has been widely recognized for some time. A number of initiatives have been undertaken by the MAJCOMs to establish supplementary techniques that complement the USAF Priority System and are more sensitive to immediate operational requirements. In August 1978, for example, General Wilbur L. Creech, TAC Commander, instituted a robusting policy within TAC to ensure resource allocation decisions are consistent with the mission importance of tactical fighter wings (TFW). Under this initiative, TAC's wings and the squadrons within each wing were essentially treated as Alpha, Bravo, and Charlie elements with the A squadron of the A wing assigned the highest priority. [74] Within this priority scheme, limited resources were parceled out to each unit through a "top-down" flow process that applied available resources to the most important squadron's shortages first and then to the

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[74] Within TAC, the 1st TFW at Langley AFB was treated as the A wing; the 33rd TFW at Eglin AFB was treated as the B wing; and the 49th TFW at Holloman AFB was treated as the C wing. This robusting scheme resulted in a richer supply of resources to high priority units and a leaner supply to lower priority units. Concentration of supply shortages in this manner put the 1st TFW in a C-1 status, the 33rd TFW in a C-2/C-3 status, and the 49th TFW into C-3 status during this period.

next squadron's shortages in descending order of priority (e.g., AA, AB, AC, BA, BB, BC, CA, etc.). Thus, if the three wings had a total authorized quantity of 27 spare LRUs for the F-15 Fire Control Computer and only six available, the AA and AB squadron would have received all on-hand assets. This approach was revised in 1985 after General Robert D. Russ assumed command of TAC. Joint agreement between the Tactical Air Forces (TAF) now provides for allocation of critical resources to tactical fighter units using Dyna-METRIC models, such as TAC PACER II, to determine an ideal distribution of available resources. Maximum overall sortie capability at D+30 for all units is the goal under this robusting concept and a more evenly distribution of critical spares is now in evidence across TAC units. This approach has resulted in a higher overall combat capability.

Under AFLOGCON, a dynamic priority allocation scheme is required that can effectively deal with rapid operational changes. UMMIPS, from this perspective, provides a starting point for determining the relative priority of specific combat and combat support operations. The resource balancing mechanism illustrated in Fig 35 assumes all three squadrons have identical precedence ratings and that their missions are of equal importance. Since this is rarely the case in peace and almost assuredly not in war, a systematic way of dealing with unit-specific priorities is required to guide the resource assessment/allocation processes in the theater or region and at the depot. Under the ADS concept of operations illustrated in Fig 42, the basic priority scheme is to supply the nearest available assets in the region to satisfy unit MICAP conditions that will bring NFMC aircraft to fully mission capable status. LRC decision-makers can, of course, override each redistribution action if a higher need exists elsewhere or is expected to generate in support of planned operations at another location. Instead of relying on manual intervention, present resource allocation models can be updated as operational priorities and

flying programs change. The speed of that update is a function of how quickly operational priorities can be translated into inputs to an allocation algorithm. The basic parameter used by WSMIS and DRIVE for this purpose is an aircraft availability goal for each unit at D+30. A Direct Support Objective (DSO) of 6 NFMC aircraft per 24 UE squadron (e.g., 75 percent) is currently the standard criteria for UNITREP assessments and resource requirement/allocation processes.[75] While it may be feasible to rapidly convert operational priorities at the unit-level into specific aircraft availability targets, a simpler and more practical approach is needed in the near-term.

A simple rank order of priority for units in each region or theater would provide a manageable tool for translating the regional commander's priorities into weighted factors for manual or automated resource allocation. This approach would expand the Robusting Priority Code (RPC) concept presently used by the MAJCOMs to support WSMIS UNITREP assessments and build on the on-going joint LE/XO initiative to develop unit-specific priorities for major theaters of operation.[76] It would also satisfy the needs of a regional priority balancing mechanism without threatening the

[75] During CORONA 86, General Larry D. Welsh, CSAF, directed that the DSO be lowered from 4 to 6 NFMC aircraft to ensure Air Force resource requirements and assessments of unit resource and training status are consistent with the funding/resource constraints within which the Air Force must operate. DSOs were originally established recognizing that 100 percent aircraft availability at D+30 cannot be achieved and that funding requirements increase dramatically as this upper limit is neared.

[76] RPCs for each worldwide location identify the priority order of collocated units. These priorities require inter-command agreement if more than one MAJCOM is involved. On-base assets (e.g., WRSK/BLSS, POS, DIFM, MSK, etc.) are allocated to each unit's prepositioned WRM requirement in descending order of priority until requirements are satisfied or assets are exhausted. MAJCOMs feed AFLC's worldwide CSMS data base with current asset status. WSMIS uses this information to determine sortie and aircraft availability capabilities at D+30 as well as the kit fill rate. WSMIS outputs are provided to the MAJCOMs and used to compute C-ratings in accordance with AFR 55-15. The Air Staff is concentrating on rank ordering units within each theater of operations based on JSCP/WMP guidance and follow-up that effort with composite rankings for allocating common resources across theaters.

stability a fixed DSO target provides to theater and depot resource requirements processes. The greatest benefit, however, is considered to be the simplicity with which such a priority ranking scheme can be applied in the field under combat conditions. Moreover, future expansion of the concept to contractor, joint service, and allied operations should be much easier to undertake. Given this capability, regional/theater and depot command and control centers will have a ready means to identify and carry out reallocation decisions in response to significant changes that directly impact the readiness and sustainability of operational units.

Weapon System Allocation

Improvements to the basic USAF Priority System have also been sought at the wholesale level to obtain maximum return on investment within specified funding constraints. In September 1975, AFLC developed the concept upon which the Logistics Support Priorities (LSP) shown in Fig 45 are based. LSPs are computed for each major weapon system and selected communications-electronics (CE) programs to arrive at a weighted average of precedence ratings and programmed activity levels assigned to operational units worldwide. The methodology used to roll up unit-specific priorities into composite LSPs is illustrated in Fig 46.

The end result of this process yields numerical indicators that provide logistics resource managers with a more responsive yardstick for dealing with competing program requirements. Aggregate measures of mission importance for major weapon systems have been matched with mission item essentiality codes (MIEC) assigned to individual items of supply to ensure item or commodity-oriented resource allocation decisions are consistent with priorities at the weapon system level. AFLC has traditionally absorbed shortfalls in funding by eliminating less essential, lower

ORGANIZATION PRECEDENCE RATING	ORGANIZATION PRIORITY INDEX (A)	SORTIES (B)	INDEX X SORTIES (A) X (B)
2-05	2.40	25	60.0
2-06	2.50	210	504.0
2-07	2.60	14	36.4
2-10	2.90	1537	4457.3
3-03	3.20	83	265.6
4-02	4.10	25	102.5
4-08	4.70	702	3299.4
5-02	5.10	32	163.2
	TOTAL	2628	8888.4

LSP = 8888.4 ÷ 2628 = 3.38

Fig 46. Computational Process for Logistics Support Priorities.[77] (75:9)

priority resource requirements. For items of supply, reductions to standard safety levels have normally been sufficient to offset past funding cuts. Through tools such as VSL, AFLC has minimized the impact of such cuts by applying a relatively higher safety level to items that are more prone to go out of stock. Dyna-METRIC techniques have made it possible to go beyond VSL techniques that minimize backorders and to optimize item safety levels to achieve specified aircraft availability goals. The Aircraft Availability Model (AAM) replaced the VSL computation of peacetime safety levels for recoverable items in December 1987 to begin the process of relating spares funding in this area directly to weapon system availability goals. Fig 47 illustrates the weapon system indenture relationships used by VSL and AAM to compute safety level requirements. AAM's greater sensitivity to the interdependency of weapon system

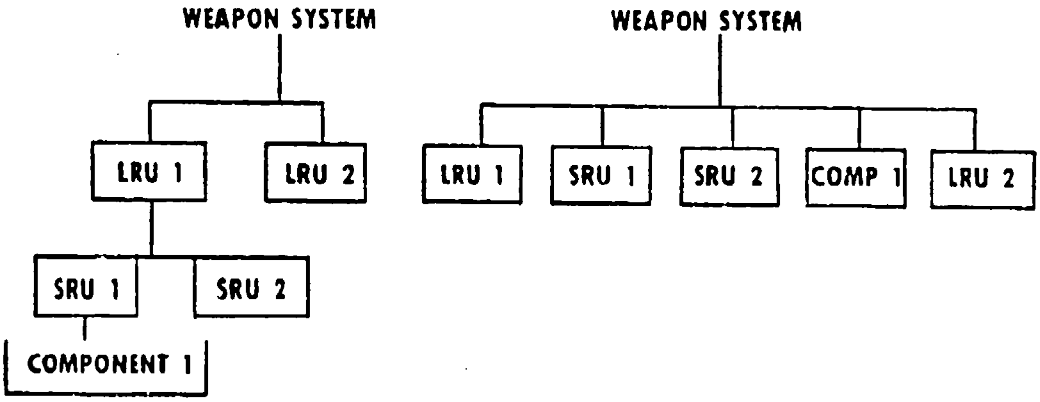

Fig 47. Comparison of Weapon Indenture Structures - VSL vs. AAM. (77:10)

components has made it possible to eliminate "buying component SRUs when there are adequate supplies of LRUs" in the system. As a result of this kind of integration in the requirements process, "significant increases in aircraft availability at the same buy cost and for a slight increase in repair costs . . . will increase weapon system availability by more than 60 percent for some weapon systems." (77:1) These improvements over VSL are illustrated for tactical weapon systems in Fig 48.

To fully take advantage of the AAM capability, aircraft availability goals should be tailored to planned fiscal constraints in the outyears and selectively adjusted to produce the highest possible return in future operational capabilities. AFLC is examining the possibility of using LSPs as weighting factors in the AAM algorithm to improve its responsiveness to programmed weapon system priorities. Even with such enhancements, it must be recognized that effective buying actions are at least two years away from providing resources that can be applied to support combat operations. Repair actions, on the other hand, are a ready source for replenishment of

A/C MD	VSL COST ($M)	VSL AVAIL	AAM COST ($M)	AAM AVAIL	A/C INCREASE OVER VSL
A7	118.9	81.1	105.5	82.7	5.2
A10	136.5	90.0	119.8	90.0	0.1
E3	231.8	52.2	228.9	82.5	8.8
F4	333.0	65.6	314.5	82.5	173.4
F5	12.8	84.4	11.7	85.4	0.9
F15	857.2	71.1	797.4	82.5	84.9
F16	158.0	74.1	150.4	86.5	76.3
F16C	604.8	74.7	557.7	82.5	44.2
F111	644.0	52.1	643.4	81.5	70.9
EF111A	106.4	59.2	102.7	82.7	8.5
FB111A	97.1	50.0	93.6	83.0	16.2
					TOTAL 489.1

Fig 48. Aircraft Availability Improvements for Tactical Weapon Systems.

near-term operating supplies. Resource allocation models, such as DRIVE, now make it possible to achieve similar improvements to aircraft availability over short planning horizons. The drastic O&M funding cuts directed by Congress in FY88 have served notice that existing resource management systems were not designed to deal with rapid changes of this nature. DRIVE or a DRIVE-like resource allocation capability can respond to such changes by identifying specific repair and distribution actions that will make the highest contribution to near-term aircraft availability goals. While DRIVE can continue to optimize resource decisions based on unit aircraft availability goals that are roughly equivalent to the DSO, a mechanism for adjusting specific availability goals for operational units is required to effectively integrate unit, regional, and depot support actions on a real-time basis. Air Staff initiatives to develop sets of

theater unit priorities should improve near-term weapon system allocation processes and set the stage for the tightly knit, symbiotic relationship the traditional logistics and operations communities must establish to effectively implement AFLOGCON.

Distribution and Repair

Within the FAD structure identified in Fig 45, UMMIPS establishes fifteen two-digit priority designators ranging from 01--the highest priority given to FAD I units with UND A (cannot accomplish mission)--all the way down to 15--the lowest priority assigned to FAD V units with UND C (routine stock replenishment).[77] These priority designators are consolidated into three basic issue priority groups as shown in Fig 49.

Incremental time standards for CONUS and overseas areas are tied to these issue priority groups to selectively and uniformly focus high intensity management actions at all levels of the logistics system on the most pressing needs. Under this broad framework for priority allocation, each unit's priority is restricted to the three priority designators that apply to the urgencies of need for its assigned FAD. Processing actions within each priority designator are governed by additional ranking criteria to guide specific allocation actions. Requisition release sequence within a priority designator category places the highest priority on requisitions with a JCS project code and, in descending order, on overseas MICAPs (999 in the required delivery date field), CONUS MICAPs, need dates that fall

[77] Unlike the robusting scheme used by TAC, priority designators do not follow a IA, IB, IC, IIA, IIB, . . . VC order of importance. Illustrated in Fig 49, the actual sequence seeks an equitable balance between high and low priority needs across all FADs. Standard UMMIPS timeframes have remained unchanged since the early 1970s. In CONUS, for example, UMMIPS standards require delivery within 8 days for IPG I, 12 days for IPG II, and 31 days for IPG III. Air Force standards, revised in Jan 88, lowered these targets to 7 days for IPG I, 11 days for IPG II, and 24 days for IPG III.

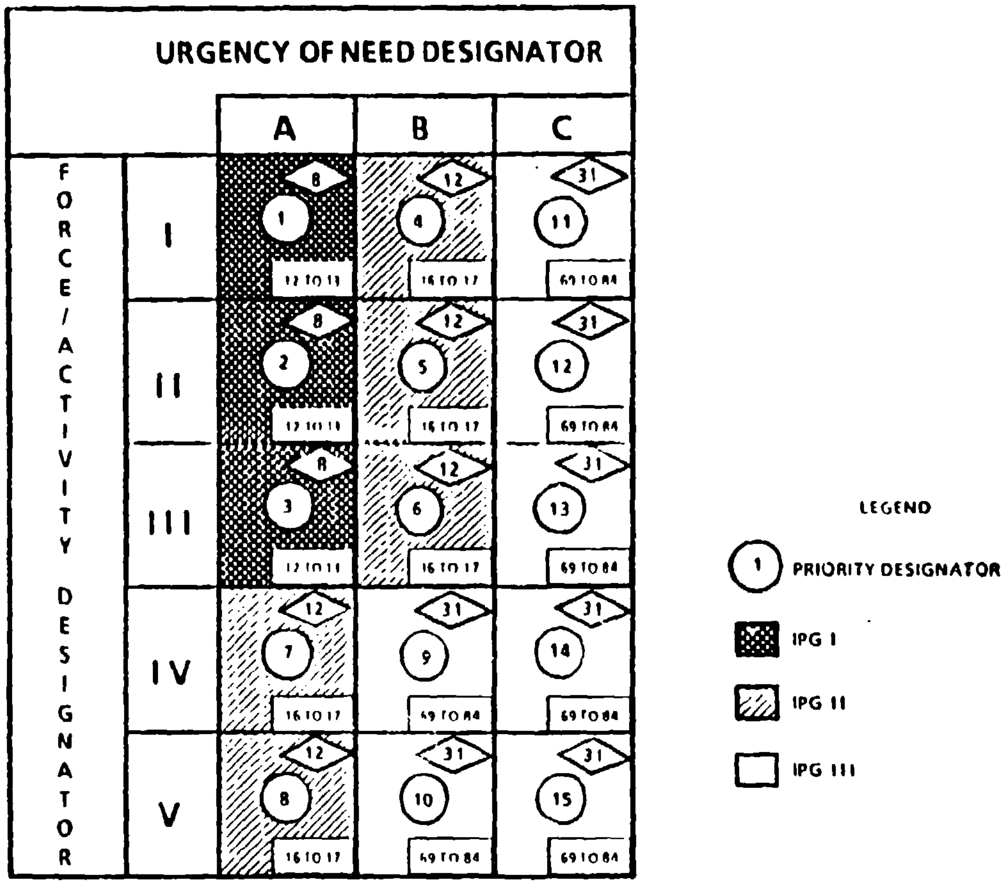

Fig 49. FAD/UND Conversion into Priority Designators and Issue Priority Groups.

within the UMMIPS time standard, and finally the age of the requisition.[78] Within AFLC, requisitions are automatically released against this criteria until stocks are drawn down to predetermined control levels or if manual release is warranted to meet unique management needs. In either of these events, manual intervention by the item manager is required to review

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[78] This criteria is used at the wholesale level to discriminate among requirements that compete for available resources. In addition to using Air Force precedence ratings to differentiate among programs at the retail level, the Air Force releases assets based on (1) the urgency justification code; (2) FAD; (3) type due out with preference given, in priority order, to MICAPs, JCS/OSD project codes, oldest date of due outs, AWPs, MAC offshore and forward stockage requirements, and WRM fill actions; and finally (4) requisition age. Manual overrides of the automated release sequence in the Sperry 1100/60 Phase IV computer can be initiated to satisfy special processing requirements. (78:A-1)

worldwide status and to make individual asset release decisions that strive to get the highest utility from available resources. This task is extremely challenging.

To successfully deal with the dynamics of critical items requires knowledge of a broad range of item management, system management, and related depot support functions. It also demands effective interfaces with the operational units that use the item. Much of the information needed by the item manager to make effective allocation decisions is presently not readily available or outdated. Moreover when the raw data is available, no practical decision tools exists to translate it into specific guidance for item management execution actions.

The Dyna-METRIC-like techniques of DRIVE can provide "the decision tools needed to effectively prioritize repair and distribution actions consistent with weapon system and equipment availability goals or those operational priorities commanders establish for specific combat and combat support units." (12:1) DRIVE does this by considering the most recent asset status worldwide and relating it to the expected peace and wartime flying requirements of specific weapon systems at individual operating locations worldwide. DRIVE also considers the relative importance of each weapon systems in terms of an aircraft availability goal for each unit. For units with a combat coded mission, total flying hours for D to D+30 are added to the peacetime operating hours to support the sustainability needs of the unit as well as readiness requirements. On an item-by-item basis, DRIVE computes the expected demands that must be supported; applies available worldwide assets to this requirement; and, through marginal analysis techniques, identifies specific distribution and repair actions that make the highest contribution to aircraft availability goals at each operational location. The model accomplishes this by assessing "the availability

impact of adding a serviceable asset at a given base and prepares a list, for each item at each base, of the increase in availability expected when a serviceable asset is added." (12:31) After having identified which items yield the highest payoff, DRIVE determines the best way to satisfy the expected demands. Specific directions, such as shipping an SRU rather than its parent LRU from point A to point B, resequencing items scheduled for repair in shop X, Y, or Z (e.g., the avionics shop, the microwave shop, etc.), or inducting a new item that wasn't scheduled for repair, are provided to the item manager. Individual repair actions recommended by DRIVE not only consider the immediate high payoff in aircraft availability when the item is returned to serviceable condition but also the cost of repair, shop flow times, and work station capacity in arriving at the optimum repair requirement.

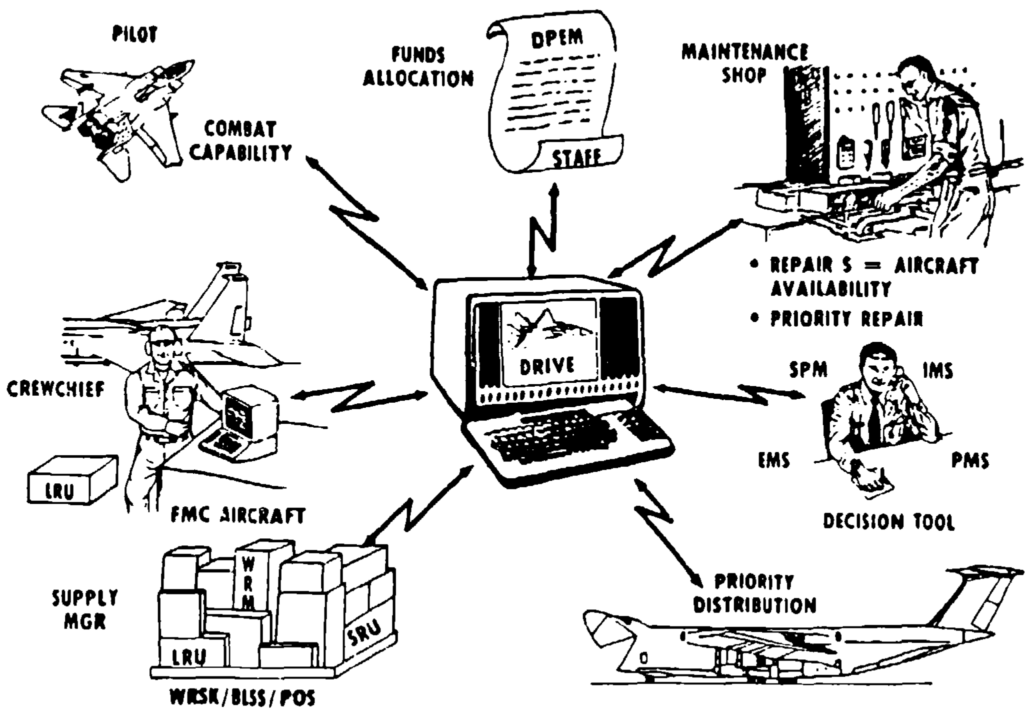

Fig 50. Logistics Integration Via DRIVE. (80:6)

By linking critical resources at the base and depot to operational aircraft availability in the field, DRIVE provides a decision tool that can be used to effectively integrate logistics actions at all levels of the logistics system. This capability is illustrated in Fig 50. Prototype test results at the Ogden Air Logistics Center have produced promising results that indicate DRIVE significantly out-performs MISTR (Management of Items Subject to Repair), the traditional depot repair scheduling system, in responding to operational needs. Fig 51 shows the increased aircraft availability achieved by applying DRIVE to selected F-16 avionics components. This comparison is based on WSMIS simulation techniques that translate changes in actual asset positions at worldwide locations into expected FMC aircraft capability at D+30.

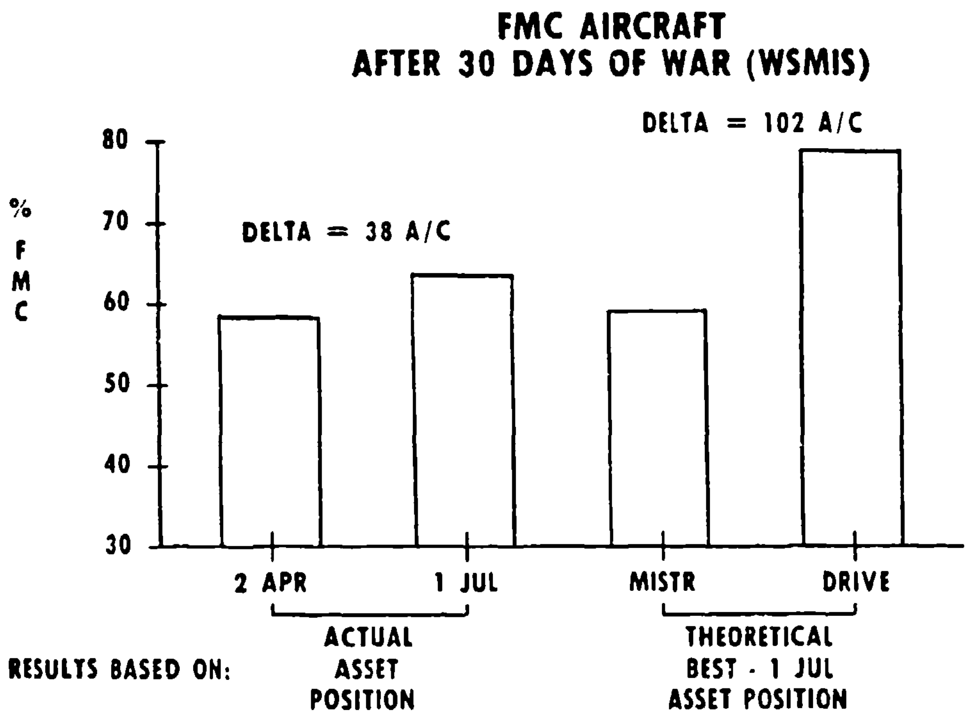

Fig 51. DRIVE Versus MISTR - A Performance Comparison. (80:16)

From a distribution standpoint, DRIVE provides the item manager short-term feedback on worldwide asset shortages and the optimum priority release sequence for items that are presently on the shelf and/or may become available through repair, buy, or other logistics actions. The weapon system indenture relationships used by DRIVE in conjunction with unit-specific aircraft availability goals make it possible to identify LRUs, SRUs, and "bit and piece" repair parts that may be more critical to unit operations than MICAP items. Under AFLOGCON, the ability to differentiate between the operational priorities established by the combatant CINCs and to rapidly react to changing events could easily result in higher priorities for items that are critically important to near-term operations but fail to meet the traditional MICAP criteria.

DRIVE's priority allocation scheme, in this context, will add momentum to the cultural changes that have shifted DOD management emphasis from an item-oriented fill rate and MICAP orientation toward measures of FMC aircraft availability from D through D+30 and beyond. Such shifts have been triggered by rapidly advancing marginal analysis and Dyna-METRIC modeling techniques (e.g., VSL, AAM, D029, RAM, SAM, GWAM, etc.) that have made it possible to tie items directly to weapon system availability goals. Moreover, DRIVE can move this cultural change beyond the item-to-weapon system transition by laying the foundation for regional decision tools that can be used by depot and theater LRCs to better allocate resources to joint and combined area operations involving multiple weapon and support systems. Such a capability will provide AFLC's Logistics Operations Center with the means to better coordinate item management, system management, and other key depot support activities and to exercise the command and control functions the AFLC commander must have to effectively support US and allied operations worldwide.

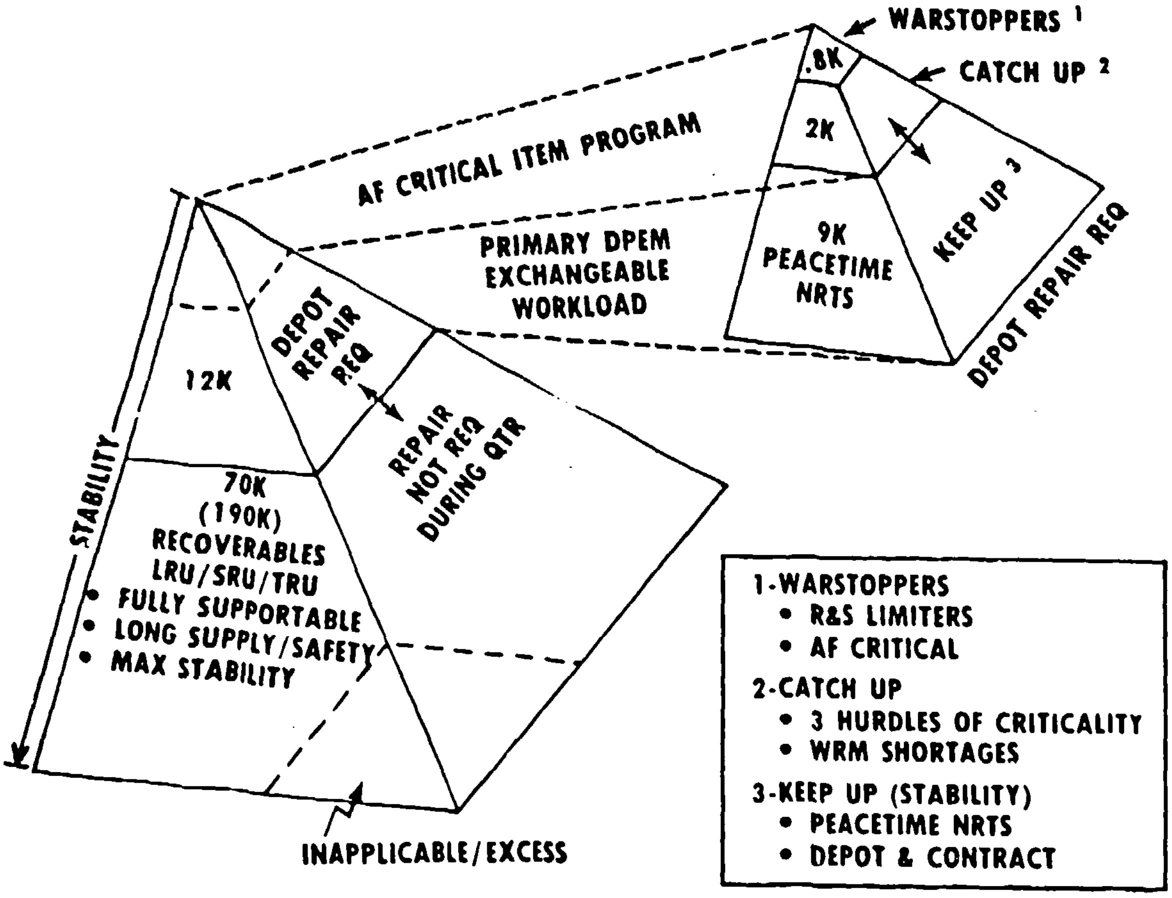

Fig 52. Recoverable Item Population by Type of Item. (81:11)

The establishment of AFLC's DRIVE Task Force in February 1988 has brought together highly talented and specialized experts from all functional areas impacted by DRIVE. From that pool of resources has emerged an approved concept of operation for institutionalizing DRIVE within the Command. Under this operating concept, emphasis is placed on "the significant few" items that contribute the most to combat capability.[79] Illustrated in Fig 52, DRIVE will be an intermediate process linking D041 and D073.

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[79] The principle of the significant few is credited to Vilfredo Pareto, a 19th century Italian philosopher, economist, and sociologist whose research revealed that 5-15 percent of all items account for 85-95 percent of the total management effort invested (i.e., sales, MICAP hours, etc.)

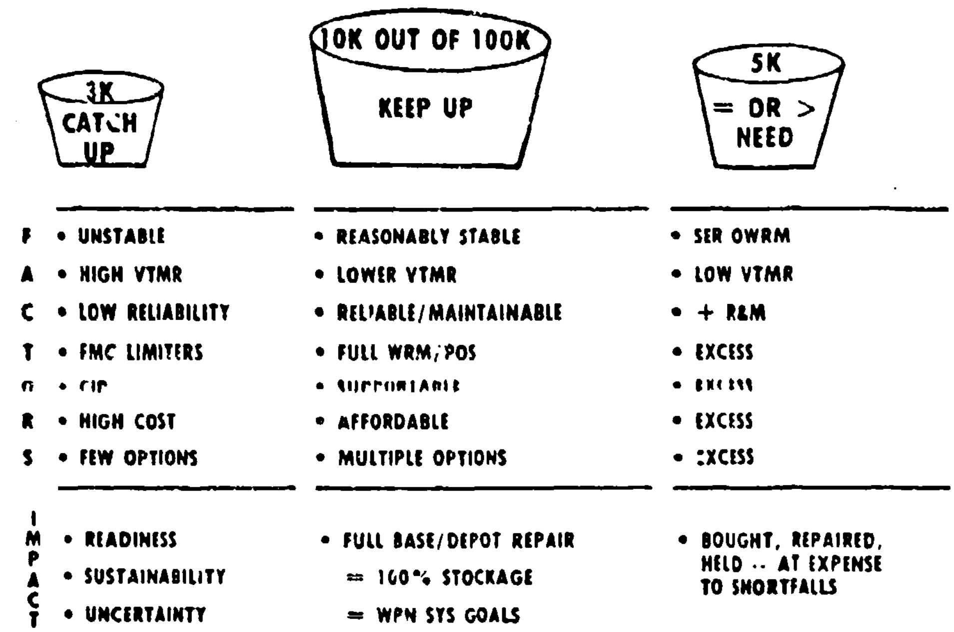

Fig 53. Key Management Relationships for Recoverable Items.

Quarterly, bi-weekly, and "on demand" processing capability will be designed into DRIVE to ensure appropriate levels of sensitivity to items that have relatively stable demand patterns, more active items, and critical items (i.e. catch up, keep up, and war stoppers)." (71:2) Of the total recoverable item population in Budget Program 15, approximately 13,000 items are scheduled for depot repair during any given fiscal year quarter. Of these items, only 2,800 items fall into the new "hurdles of criticality" established for the Air Force Critical Item Program in 1987.[80] DRIVE will ensure that AFLC managers work the worst items first and productively align available resources as conditions change to achieve

[80] "The critical item program identifies items for intensive management which severely impact Air Force weapon systems. As a result of the joint MAJCOM Fourth Critical Item Conference in 1985, the Air Force decided to change item selection criteria from a narrow focus that considered MICAP

the highest return in aircraft availability at specified operating locations. A more detailed look at the nature of AFLC's active recoverable items is provided in Fig 53 to underscore the importance of DRIVE to improved resource allocation decisions.

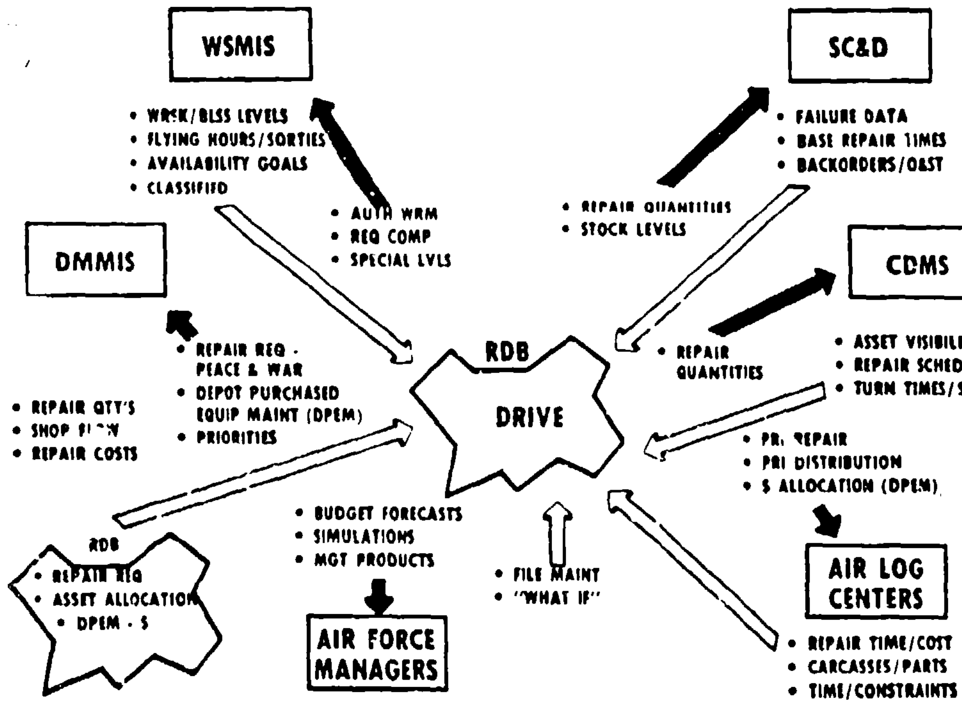

Fig 54. LMS integration Requirements for DRIVE. (81:16)

Although DRIVE will directly impact AFLC's primary LMS programs as illustrated in Fig 54, the task of functionally integrating DRIVE into existing LMS modernization schedules will not require major change to the

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80 (Con't) hours, cannibalization actions, buy or repair positions, supply support status, and other management decisions" to a broader and more comprehensive approach that is "proactive, multi-dimensional, and considers an item's impact on both weapon system readiness and sustainability." The three hurdles of criticality identify, in increasing order of severity, potential problem items, problem items, and critical items which will be selectively managed using a systemic approach to corrective and preventative actions. An automated critical item network (ACIN) and WSMIS will provide the data bases for managing items under this selection criteria. (79:iii,29)

approved LMS architecture. The proposed "roadmap for DRIVE will focus on constructing a DRIVE data base using standard LMS hardware and software that this capability can readily be exported within AFLC. Memorandums of agreement with existing LMS program offices and functional staff elements will be required to support appropriate interface requirements. The objective will be to establish a production prototype system, test it, and then make carbon copies for full implementation within AFLC." (71:2)

This proposed development concept will require that the SC&D system apply DRIVE allocation priorities to backordered items. While the initial emphasis will be on warstoppers, improved supply effectiveness for other items will be sought in the future as tradeoffs between changes to UMMIPS policies and improvements in operational support become more defined. Changes to the standard Air Force asset release sequence will also be required to take full advantage of DRIVE's aircraft availability allocation capability. Phase-in of standard Air Force and DOD system interfaces will be undertaken as required to support automated processing of item manager allocation decisions. Such a capability will grow in importance as DRIVE is applied to multiple weapon systems, contract workloads, and other Service and FMS requirements.[81]

Recent OSD efforts to pave the way for the future have produced an awareness that the concepts behind AFLOGCON can significantly improve the defense logistics system. Briefed by OSD (P&L) during FUTURE LOOK 88, OSD's Logistics 2010 initiative seeks to apply this concept defense-

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[81] Under current DRIVE procedures, "DRIVE is an aid in the decision making process, not a replacement for good judgement." The item manager's discretion will continue to play a vital role in ensuring that high priority requirements for MICAPs, special programs, contract deadlines, FMS customers, and other approved programs are equitably supported within existing resource constraints. Enhancements to the DRIVE algorithm are being developed to minimize exception processing actions of this nature. (12:3-1)

wide. (82,83:2) Close working relationships between AFLC, RAND, OSD's Defense Spares Initiatives Office (DSIO), and operational MAJCOM activities involved in DRIVE prototype development, test, and implementation actions could significantly enhance and accelerate institutionalization of the structural changes that must be made to effectively introduce regional and weapon system-oriented priority allocation decision tools within DOD.

Transportation

As highlighted in the resource balancing illustrations provided in Figures 35 and 36, maximum sortie potential cannot be achieved if critically needed parts and supplies cannot be delivered in time to satisfy the demands of the operational units of greatest importance to the combatant CINCs. US forces today rely on worldwide transportation networks that are structured to support peace and wartime operations. In recent years, a unified transportation command has been established to improve coordination and command and control over all common land, sea, and airlift resources. As the Commander In Chief of the US Transportation Command, CINC MAC shoulders the overall responsibility for ensuring that sufficient worldwide transportation capability exists to support US operations worldwide and to stretch available resources to meet the most pressing requirements when demands on the system exceed actual capability. The transportation system, in this context, must provide for the continuous flow of materiel from the source of supply to the point of actual use. Moreover, in time of crisis, conflict, or all out war, the transportation system may be called upon to satisfy a wide range of challenging missions. Among these are providing humanitarian relief for famine and natural disaster, delivering security assistance equipment, transporting allied forces, and deploying US forces into combat. Under existing war plans, movement of forces is specified in sufficient detail to support planning actions at all levels of the

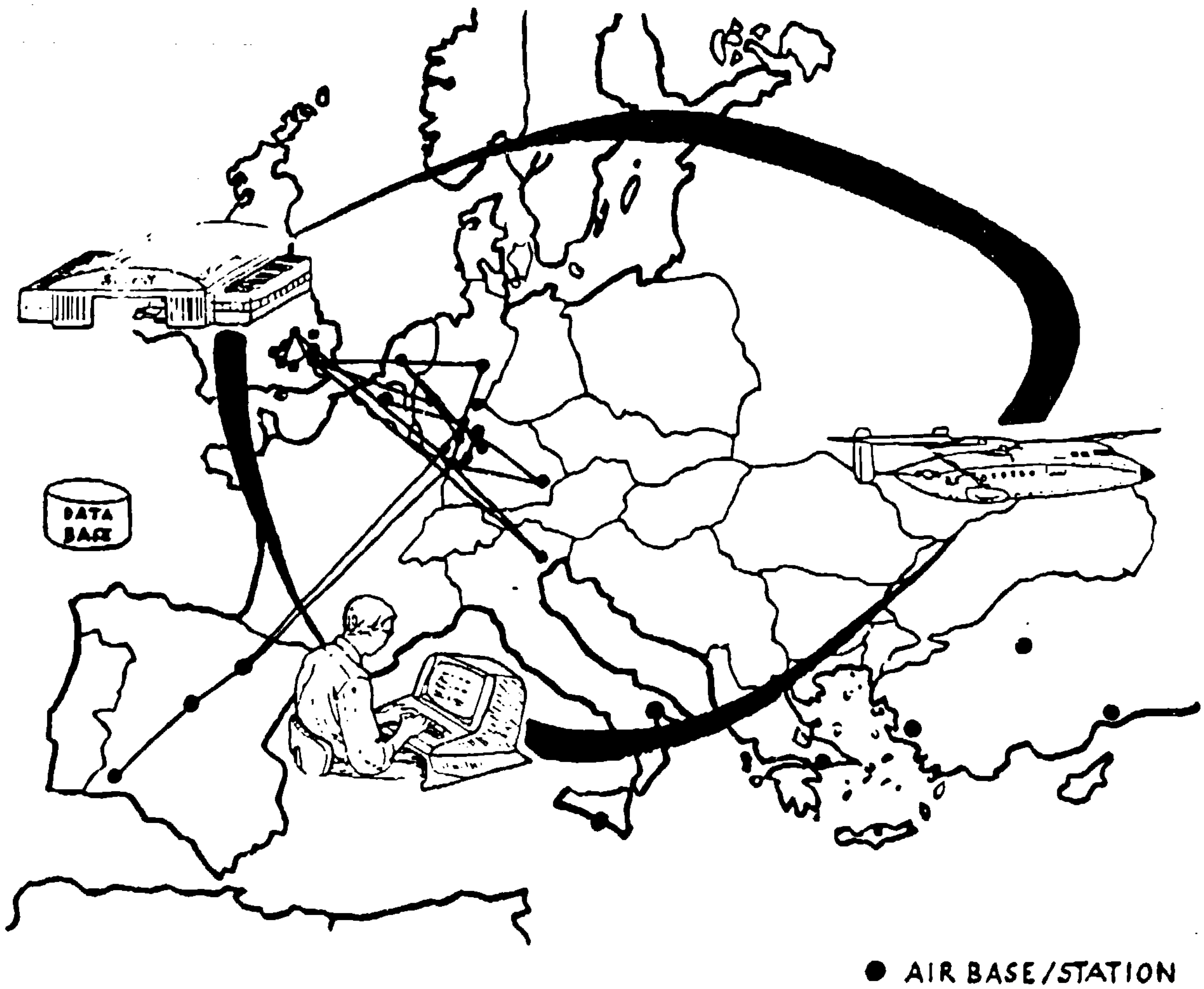

Fig 55. Route Structure for the European Distribution System.

logistics system.

Despite the uncertainty of actual movement requirements at the time of execution, preplanning to support the overall flow of forces under a wide variety of scenarios can with reasonable accuracy lead to the identification of critical nodes in existing or planned route structures, overall throughput volumes, potential chokepoints, and other limiting factors that must be remedied before war plans are carried out. The distribution networks that support UMMIPS time standards for resupply are

designed to use available transportation resources as effectively as possible in peacetime without jeopardizing the capability to support planned force deployments and high surge operations under wartime conditions. MAC's strategic airlift forces will be augmented by the Civil Reserve Air Fleet (CRAF) and other available air assets to support the tremendous inter-theater force movements demanded by the primary operational plans (OPLANS) for major theaters of operations. After these forces have been put in-theater, emphasis will shift to the movement of supplies and materiel required to sustain combat operations.

Regional and intra-theater transportation capabilities will become critical as the uncertainties associated with normal peacetime operations are compounded by combat disruption, damage, and loss of vital logistics resources. The ability to identify the status of these resources and to allocate available resources at all levels of the logistics system to the highest priorities of the combatant CINCs must be matched with a flexible and responsive transportation network that can move critical resources rapidly within the theater or CONUS region and from the depot to the theater, if necessary, under combat conditions. Such a capability should be established and exercised in peacetime to maintain an ideal balance between available logistics resources and the ever-changing needs of operational units. Regional and worldwide logistics control centers should manage critical logistics resources on an area-wide basis with emphasis on immediate operational priorities that consider peacetime readiness and wartime sustainability objectives. This type of operational control over unit-initiated UMMIPS supply actions will ensure that regional and theater CINC priorities directly influence allocation decisions as critical logistics resources are drawn down to unacceptable levels. Proficiencies achieved in regional control under peacetime conditions will increase overall weapon system availability in major regions and enhance transition

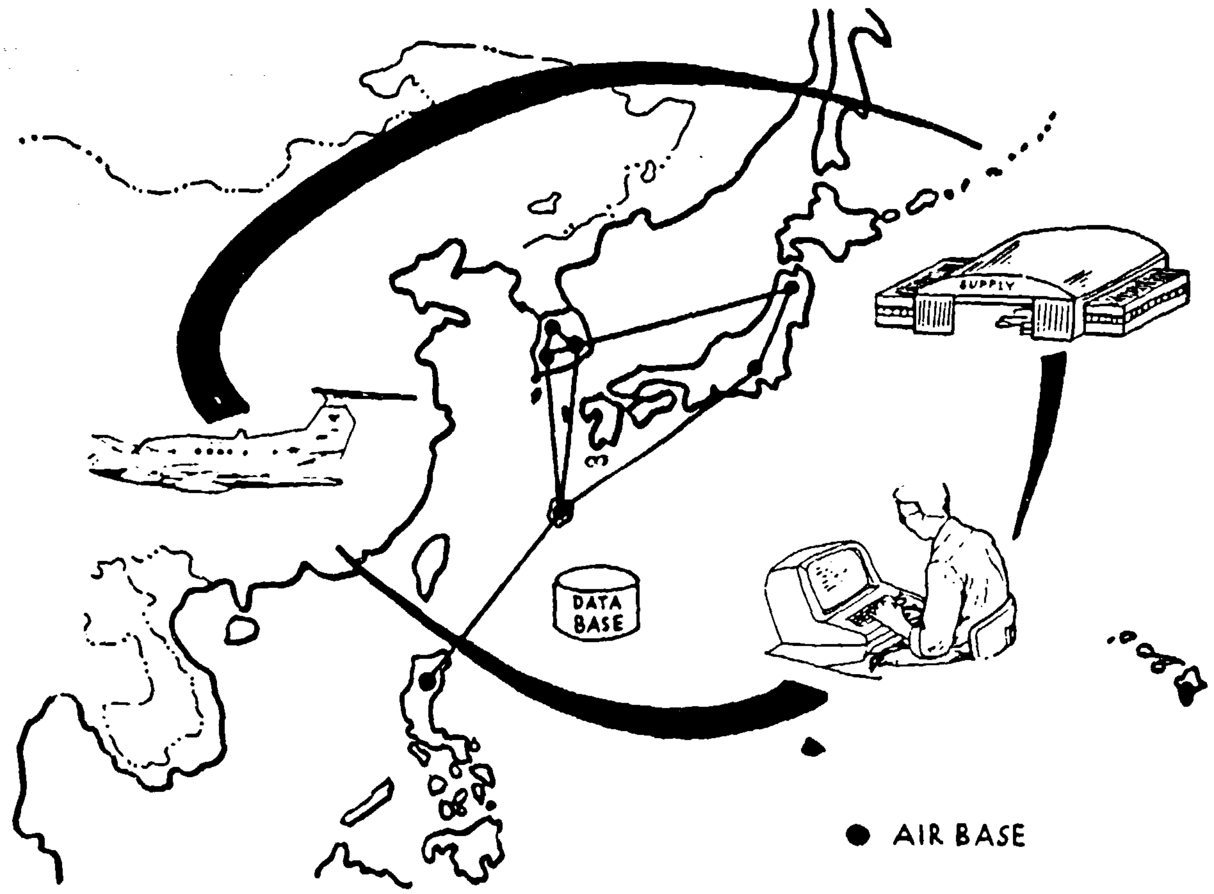

Fig 56. Route Structure for the Pacific Distribution System.

to the far more demanding wartime environment. The ADS concept of operations illustrated in Fig 42 provides a basic structure for exercising such regional control over critical resources. Available transportation resources can best be utilized under such a regional network concept.

The existing and planned redistribution networks in Europe and the Pacific are illustrated in Figures 55 and 56 to highlight network characteristics that drive theater-unique transportation requirements. Moreover as illustrated in Fig 57, main operating bases today are the primary source of support for units that operate at collocated operating locations under wartime conditions. The high density of Air Force operating locations in Europe, for example contrast sharply with the vast distances that must be

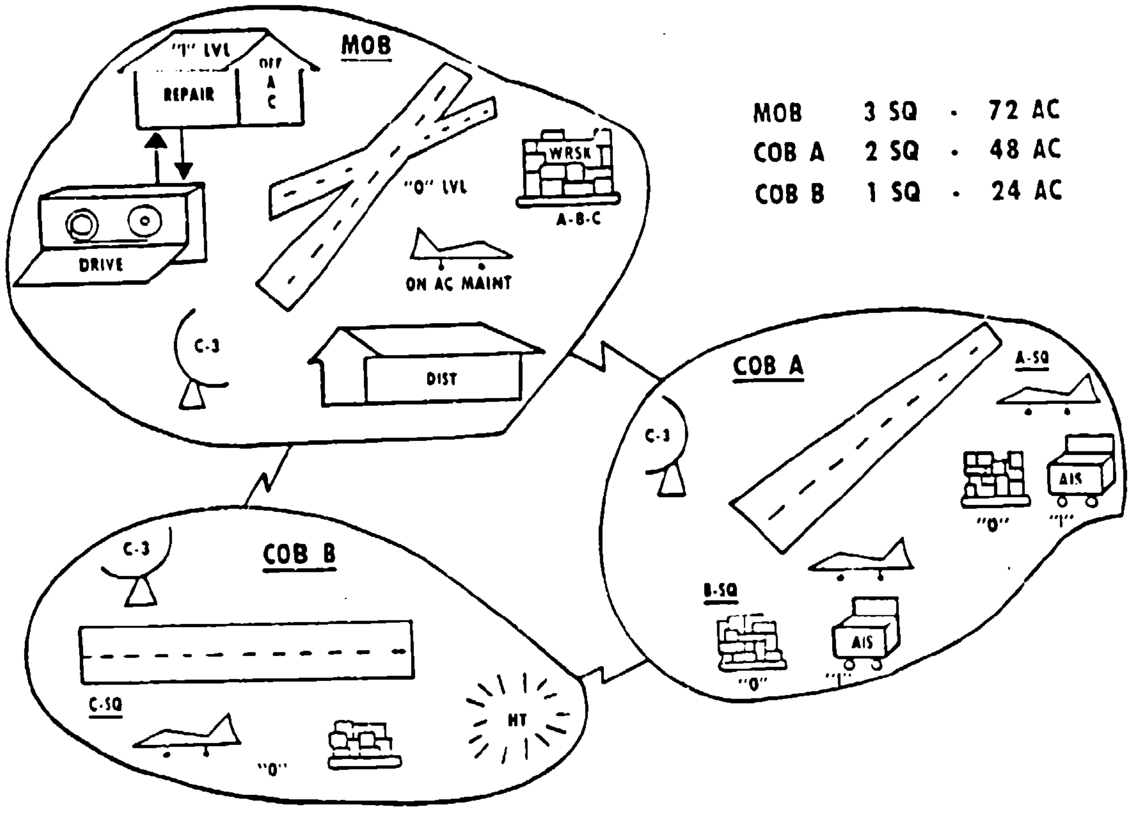

Fig 57. MOB/COB Mutual Support Relationships.

traversed in the Pacific. Rear-area sanctuaries, in turn, are more or less susceptible to combat loss or disruption.[82] Alternate route structures, basing schemes, and off-load techniques can lower vulnerability and enhance

[82] The growing Soviet presence at Cam Rham Bay and the improved range of Soviet tactical and bomber aircraft in the Western Pacific area have forced PACAF to reassess the past practice of relying on centralized intermediate maintenance for operational units in this theater of war. To reduce vulnerability and increase unit self-sufficiency, PACAF decided to phase-out the Pacific Logistics Support Center and to reestablish intermediate maintenance capability at the unit-level. Decreased reliance on PDS will shift emphasis on the continuing need to move critical supplies among theater units and provide greater "flex" in responding to wartime resupply and redistribution requirements.

the effectiveness of regional resupply and redistribution mechanisms. To ensure timely movement and resupply of forces within the theater, "MAC is prepared to move forces into battle through airland or airdrop operations. Forces can be resupplied by airdrop much the same as they were resupplied at Khe Sanh, but an established airlift channel is necessary for routine resupply. A channel is simply a route designed to move passengers and cargo between two points on a regularly scheduled basis." Under MAC's Channel Productivity Improvement Program, the effectiveness of continuing underused channels is periodically assessed and smaller aircraft (e.g., C-12, C-21, etc.) may be substituted for larger aircraft including the C-130--the tactical airlift workhorse of the Air Force. Extensive use of the C-7 Caribou during the Viet Nam conflict demonstrated that such aircraft could usually be loaded to 60 percent capacity (vice 40 percent for the larger and more costly to maintain C-130s) during routine and emergency resupply missions. (84:17)

The ability to match cargo requirements with available aircraft is an important factor in getting the most out of critically short resources. Regional control centers are in the best position to identify such shortfalls and to initiate action to divert shipments in transit, direct shipment among bases and operating locations in the region, or request resupply from the depot to meet urgent operational needs. A network of transportation control points stretching from AFLC's Logistics Operations Center to the ALCs, the APODs, the APOEs, and to regional control centers is required for this purpose. [83]

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83 Regional control centers are routinely established "under fire" today when large scale operations warrant such action. Consolidation of shipments and centralized cargo flow planning in support of logistics operations for Grenada, for example, were controlled by the Air Force at Pope AFB. The Army's emphasis on movement of forces preempted logistics transportation requirements on many occasions. This reduced the overall effectiveness of logistics support and impaired operational performance.

Expedited movement of critical reparable materiel must also be monitored in peace and closely controlled under wartime conditions to ensure these carcasses are automatically retrograded to the depot for expedited repair. "Returning cargo aircraft are likely to be saturated with casualty evacuation requirements. Additionally, the allowable turn-around time for all cargo aircraft--necessitated by the deployment and resupply schedule--may not permit the loading of retrograde carcasses." (85:5-3) Moreover, to ensure continuity of the retrograde pipeline, Recovery, Classification, Collection, and Salvage (RCCS) units must be activated and be operational during the initial phases of hostilities before significant amounts of retrograde materiel can be processed back to CONUS activities. A retrograde lift plan that charts the "likely flow of reparable carcasses through the pipeline for each OPLAN" and identifies the actions required to effectively move high priority retrograde materiel back to the depots should be established to ensure critical elements of this process adequately support combat requirements.[84] (85:5-4)

Based on RAND studies, critical resupply of avionics components for the primary weapons systems that will be engaged in Europe is estimated to require three to four flights per day by standard commercial wide-bodied aircraft. While additional research could conceivably refine this estimate, a more practical approach to sizing these requirements should be based on a rough extrapolation of actual peacetime demands, wartime surge levels, expected attrition rates, battle damage, and other relevant factors. Once computed, this estimate can be converted to a broad planning

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84 Lt Gen Charles McCausland, AFLC/CV, underscored the need for such planning in Aug 87. Strategic airlift flights are scheduled to return to designated CONUS locations to off-load evacuees and retrograde materiel before taking on the next force deployment increment. Controls must be established to ensure critical materiel is expedited from these off-load points to the depots. The CONUS airlift network illustrated in Fig 58 should be integrated with MAC's inter-theater flight plans to ensure continuous movement of critical retrograde materiel. (21:3)

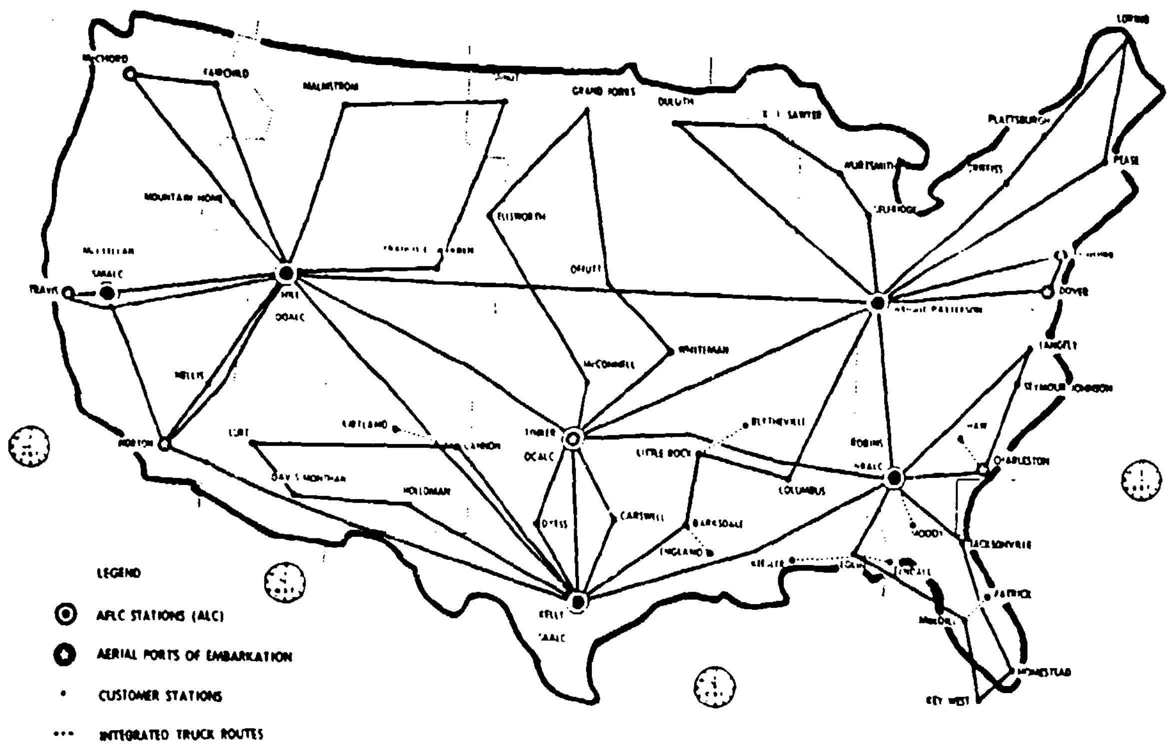

Fig 58. CONUS LOGAIR Transportation Network.

factor that can be used to reserve a portion of the strategic airlift capability for critical non-unit cargo movement. Such an approach should be sufficient for planning purposes and set the stage for determining the best way to meet this requirement. Reallocation of C-141 cargo space, dedicated CRAF flights between CONUS APODs and theater APOEs, direct non-stop flights using LOGAIR aircraft controlled by MAC enroute to the theater, or a combination of these alternatives should be examined not only in terms of satisfying the basic movement requirement but also with a view toward enhancing worldwide logistics system integration and C2 functions under highly dynamic and uncertain conditions.

Other Command Initiatives

In addition to General Hansen's initiative to improve AFLC's strategic planning process (Fig 17), numerous other command initiatives are underway to improve Air Force logistics operations. A number of these have significant potential to move AFLC and the Air Force more rapidly toward implementation of AFLOGCON. The broad architecture of the Air Force Logistics Concept of Operations demands that all logistics elements be effectively integrated and focused on creating and maintaining maximum combat capability at the unit-level. To accomplish that, every major decision that impacts the logistics system's ability to support peace and wartime operation programs should be weighed in terms of whether it will advance or hinder implementation of AFLOGCON.

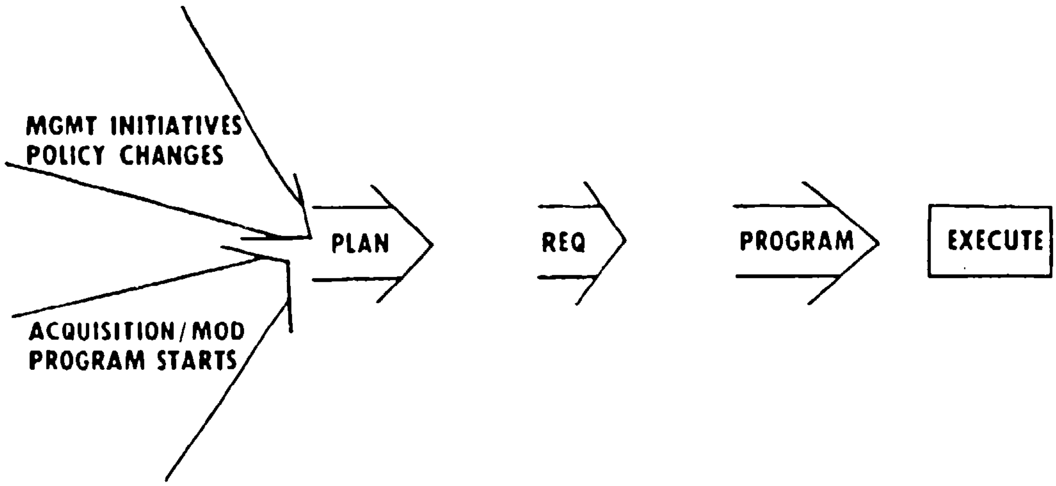

Fig 59. Integration Across Basic Management Phases. (23:22)

Illustrated in Fig 59, such system-wide integration is required during the early conceptual stages of defining new or better ways of doing business.

From that critical point on, new initiatives or programs must be nurtured as they start to take shape and move forward across the full spectrum of planning, programming, and execution activities. The Command's efforts to get its collective "arms" around new initiatives and programs that will ultimately impact the logistics infrastructure is a major step toward that objective. AFLOGCON complements such efforts by providing a master blueprint that offers stability and unambiguous direction to all logistics "architects" whose aim is to improve the Air Force logistics system. The broad yet comprehensive prioritization scheme illustrated in Figures 27, 28, 30, and 31 establishes a potential foundation for a system-wide integration mechanism of this nature.

Other significant initiatives in the planning arena include PACER CONNECT and Integrated Weapon System Management (IWSM). Both of these efforts focus on greater integration of vital elements of the Air Force logistics system. PACER CONNECT traces its origin to a 1986 study by HQ USAF. Nicknamed "Bright Idea," this study examined the alarming proliferation of data systems development activities within the Air Force. MAJCOM programs were found to be disjointed and narrowly focused on either base or depot-level functions without adequate regard to the interdependency between the wholesale and retail elements of the logistics system. To improve overall resource utilization and to effectively coordinate these programs, the Bright Idea Study concluded that Air Force wholesale and retail data system development should be consolidated under one Logistics Support Center and managed in unison on an Air Force-wide basis.[85] (91:1) AFLC subsequently

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[85] Base-level data system development is primarily accomplished by AFCC's Standard Data Systems (SSC) Center while wholesale development is assigned to AFLC's Logistics Management Systems Center at Wright-Patterson AFB. The AFLMC was established in 1975 to address topics arising from worldwide logistics operations, the planning process, logistics policies, and management systems; but, over the the years has concentrated on imprvements to retail systems. Prior to 1988, the AFLMC was an Air Force direct reporting unit (DRU) under AF/LEX. Collocated with SSC at Gunter AFS, AFLMC now reports to AFLC/XP.

initiated its own "seamless logistics" study in 1987 to explore how such a proposal might be implemented. On 15 August 1987, General Hansen redirected this effort and established PACER CONNECT with the goal of consolidating "the management of the Air Force logistics process to include studies, research, automatic data processing (ADP) systems, and obtain maximum benefit from our resources. (86:1) Under this program, the AFLMC was transferred to AFLC and more comprehensive actions to eliminate the artificial barriers between key wholesale and retail logistics research, policy making, and data system design are planned in the near future. Illustrated in Fig 60, a progressive stair-step approach toward achieving greater integration in these areas is now being pursued under a phased implementation plan.

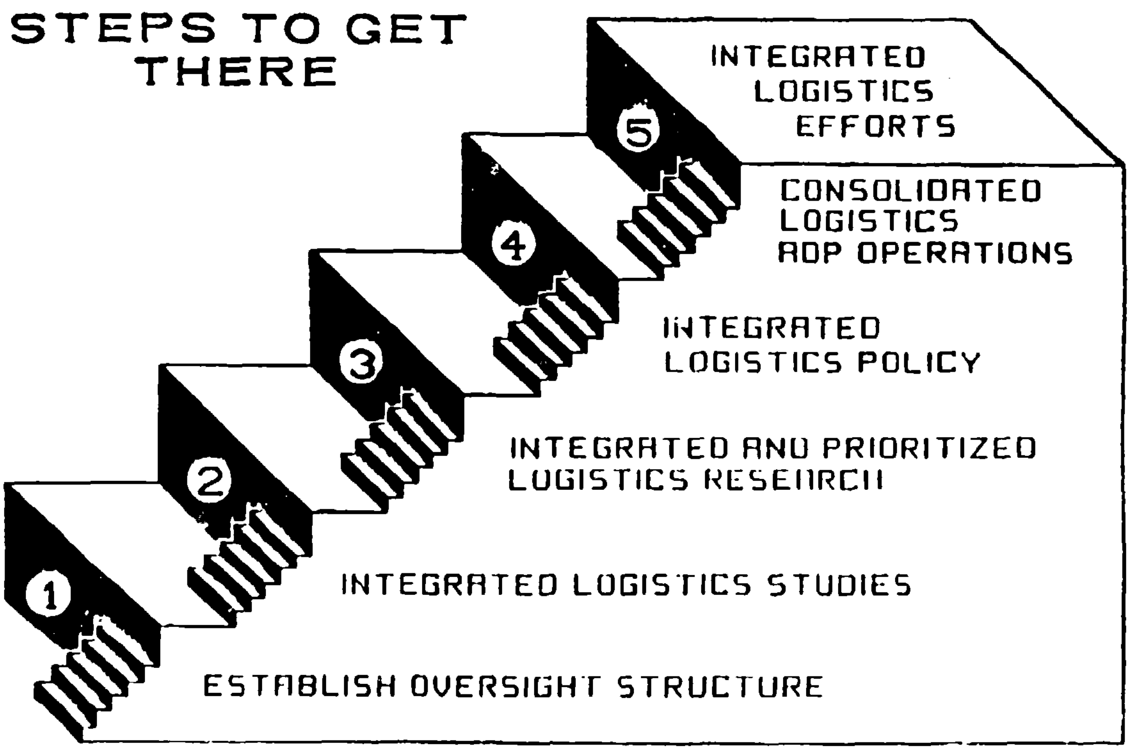
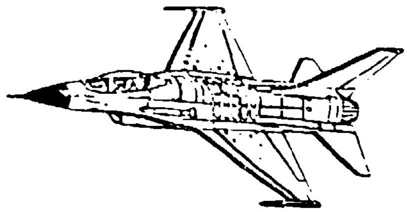


Fig 60. Scope and Strategy for PACER CONNECT. (96:15)

A Board of Advisors (BOA) consisting of senior MAJCOM and Air Staff logisticians now exercises oversight over progress toward PACER CONNECT objectives and guides Air Force-wide research and studies activities.[86]

ESTABLISH WEAPON SYSTEM ORIENTATION



OOALC	OCALC	SMALC	SAALC	WRALC
AIRFRAME	INST	GEN/PWR SUP	ENGINE	COMM
AVIONICS CPTR	HYD	BATTERIES	LIFE SUPP	COMM/NAV
FLT CTRLS	AIR COND	INER PLTFRM	FUEL CONT	ECM
INERTIAL NAV				GUN
				VTR
				MSL LCHR

Fig 61. Management Assignments by Air Logistics Center.

Unlike PACER CONNECT's Air Force-wide scope, the Integrated Weapon System Management Study focuses on AFLC's internal structure for managing Air Force logistics resources. Through a systematic review of the historical changes experienced at the depot level, this study is in the process of defining what AFLC should do to take advantage of new technology that now

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[86] Chaired by the Deputy DCS/LE, the BOA met on 13 Jan 88. The policy integration step shown in Fig 60 was not approved by the board because this was considered a HQ USAF responsibility. AFLC's influence in the policy-making process is considered sufficient to ensure Air Force-wide integration.

makes it possible to effectively integrate commodity and functional management processes with specific weapon system objectives. Past pressures to lower operating costs led to consolidation of weapon system management functions and greater specialization at the depot. The economies of scale associated with such consolidations, however, made the depots less flexible and more insensitive to weapon system meeds.[87]

In recent years, the technology for linking weapon system needs to specific resource requirements has emerged. If exploited, this growing capability can reverse the negative symptoms of consolidation without sacrificing economy of scale benefits. Weapon system master planning, weapon system PDPs, integrated infrastructure planning, and weapon system capability assessment and resource allocation tools, such as WSMIS and DRIVE, are examples of initiatives that are leading the Air Force in this direction. Through the Integrated Weapon System Management Study, AFLC will determine those organizational, functional, and policy/procedural changes that should be made to effectively manage new weapon systems under this concept.[88] Assigning item management responsibility for peculiar items to the SPM; increasing engineering control; integrating contracting, distribution, and accounting/finance, and resources management support; fencing budget authority; and collocation of the Source of Repair (SOR) for the weapon system with the SPM are options now under consideration. (87:25)

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[87] The Item Management (IM)/System Management (SM) realignment and the Technology Repair Center (TRC) concept in the mid-70s, for example, eliminated many system management offices and established unique repair capabilities at designated ALCs (e.g., automated test equipment at San Antonio, landing gears at Ogden, etc.) to pool available resources.

[88] The traditional conflicts between functional and weapon system management (e.g., occupational experience, shared resources, economy of scale, etc.) cannot be resolved unless the benefits of integrated weapon system management offset the costs. The ALCs have been tasked to develop and submit IWSM proposals for the B-1B, C-17, ATF, and the ATB for input to the new PIP/RIP/PARC integrated planning process in Apr 88. (87:26)

Parallel actions are also underway in the programming area. Refinement to existing weapon systems PDPs; more defined relationships between common infrastructure requirements and their impact on operational forces; and better ways to articulate MAJCOM support of the Air Force logistics portion of AFLC's POM are being developed to improve this process. These efforts recognize that the MAJCOMs have been hesitant to advocate logistics programs because AFLC has had difficulty in identifying specific logistics resource requirements to the supported MAJCOMs. To achieve such advocacy, AFLC "must be able to link logistic resources to the weapon systems and MAJCOMs they support, program and budget for the resources required, and execute the approved financial resources within the same relative priorities established during the programming and budgeting phase." (88:3)

Similar integration initiatives are gaining momentum in the execution process. The MM DRIVE TASK FORCE's proposal for developing DRIVE as a Command-wide repair prioritization and resource allocation tool was approved as a valid requirement and action is in process to realign funds to support this program. (89:5) Funding constraints experience by AFLC's LMS programs are forcing a hard look at competing programs and their relative contribution to near-term unit operations. In this environment, pressure is mounting to eliminate as much duplication of effort as possible. The use of WSMIS technology to satisfy requirements for DRIVE, the new Air Force Critical Item Program, GWAM, REALM, RAM, and SAM under such conditions could lead to more cohesive management of like programs that have been managed by different functional Offices of Primary Responsibility (OPR). Efforts to prototype an Industrial Surge and Mobilization Planning System (ISAMPS) could easily be interfaced with these WSMIS programs to produce a Dyna-METRIC based assessment capability that ranges from immediate operational readiness to sustainability at D+30 and beyond, until the industrial base is turned on. This approach to industrial

surge capability is consistent with the emphasis Gen Hansen has placed on identifying and resolving critical sustainability constraints. [89] (21:4)

In addition to initiatives that directly impact the planning, programming, and execution processes, AFLC has launched several new programs under General Hansen's leadership that promise to improve the productivity of the Command's workforce. Two programs of particular merit stand out in this category.

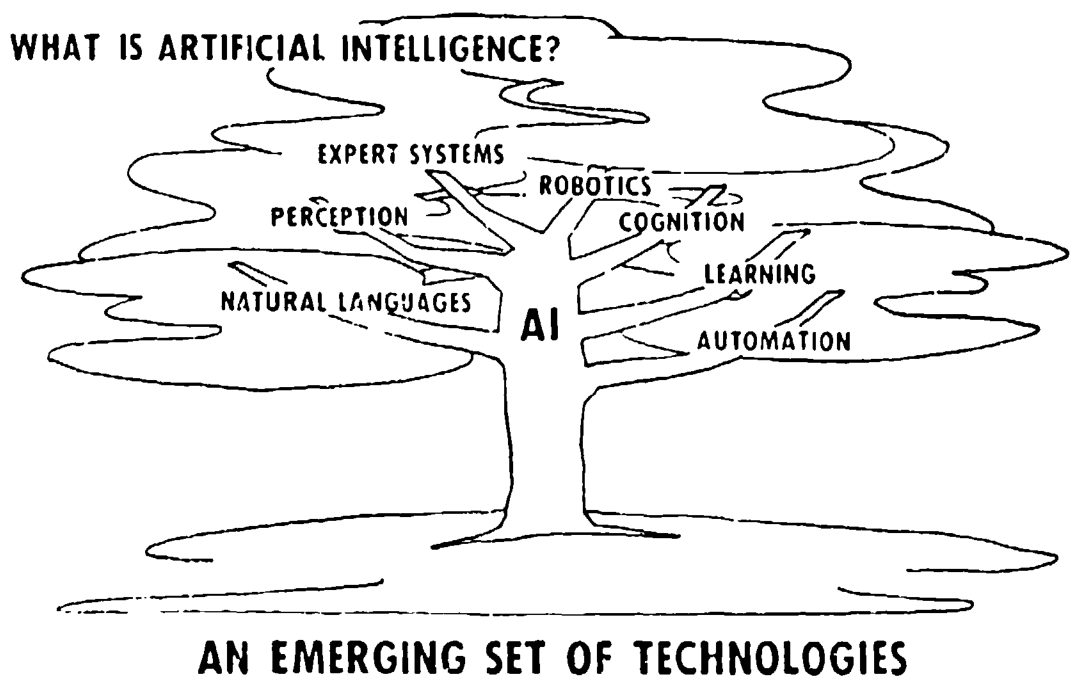

Fig 62. The World of Artificial Intelligence. (96:4)

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[89] ISAMPS is designed to automate the time-consuming, manual data collection and analysis tasks that must be completed before problems that affect industrial responsiveness to wartime requirements can be identified. (90:1)

The first of these programs involves artificial intelligence (AI). Loosely defined, AI is considered by some to be "the study of how to make computers do things at which, at the moment, people are better." Illustrated in Fig 62, an emerging set of technologies is now being managed by a dedicated program office in AFLC. This office is charged to make AI expert systems a reality within AFLC by bridging the gap between human ideas and applying those ideas through computers to all facets of logistics as shown in Fig 63.

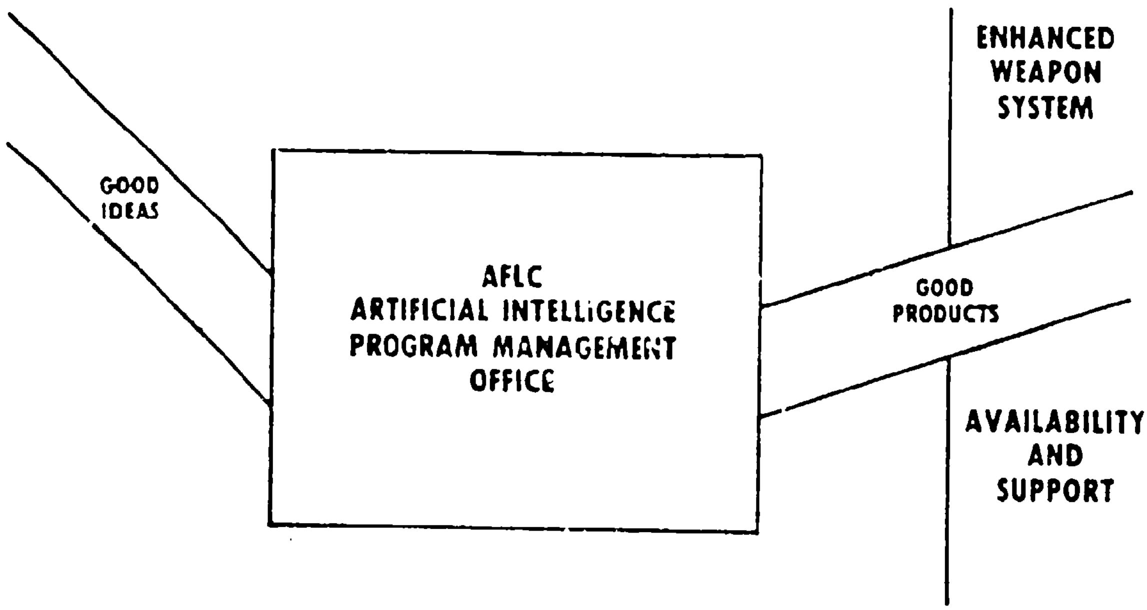

Fig 63. Transforming AI Potential Into Logistics Payoffs. (92:10)

The immense complexities of the Air Force logistics system can be reduced to much more manageable proportions by applying AI in conjunction with the advance resource prioritization and allocation tools currently in use within the Air Force. From this perspective, AI has great potential to not only improve the software that supports today's decision-making processes but, more importantly, to make it easier for human interaction with the

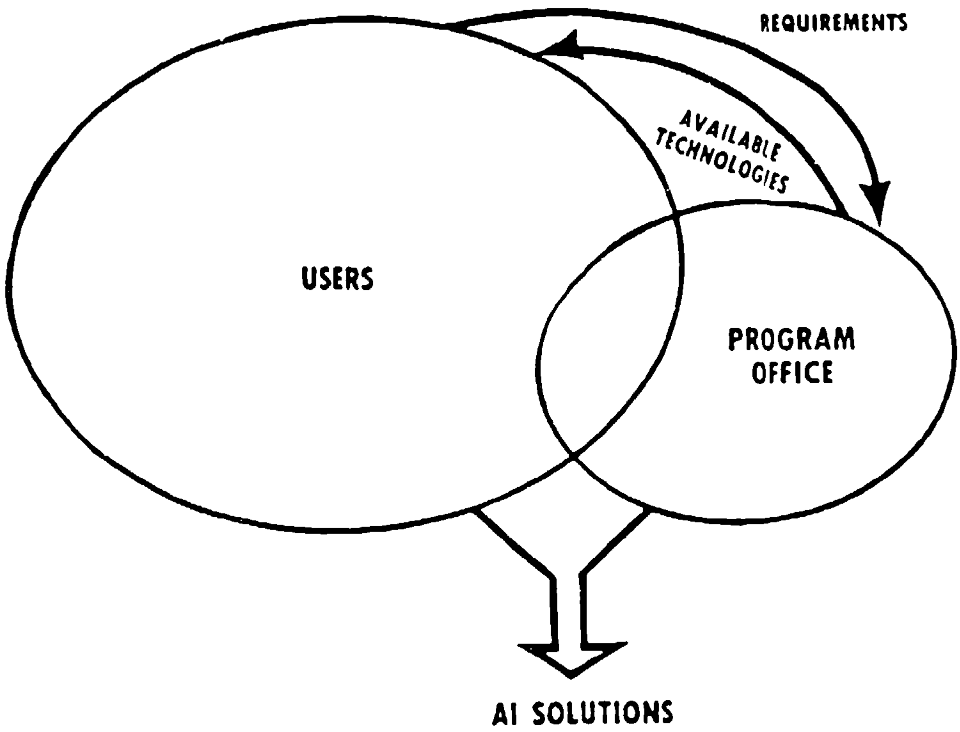

Fig 64. AI User and Program Management Office Interfaces. (92:6)

data automation environment. Natural language interfaces, for example, that allow the logistician to query the computer in plain English are expected to be operational in the foreseeable future. This capability alone will speed interrogation and decision processes significantly and eliminate the technical complexity that must be mastered by the functional user to effectively interact with existing data automation tools. Speech and vision systems that further simplify such interface relationships are already in use within DOD. User friendly automation of this nature will provide the flexibility and responsiveness Air Force decision-makers must have to effectively control critical components of the logistics system. The application of AI techniques to item management, system management, and

A - TEAM

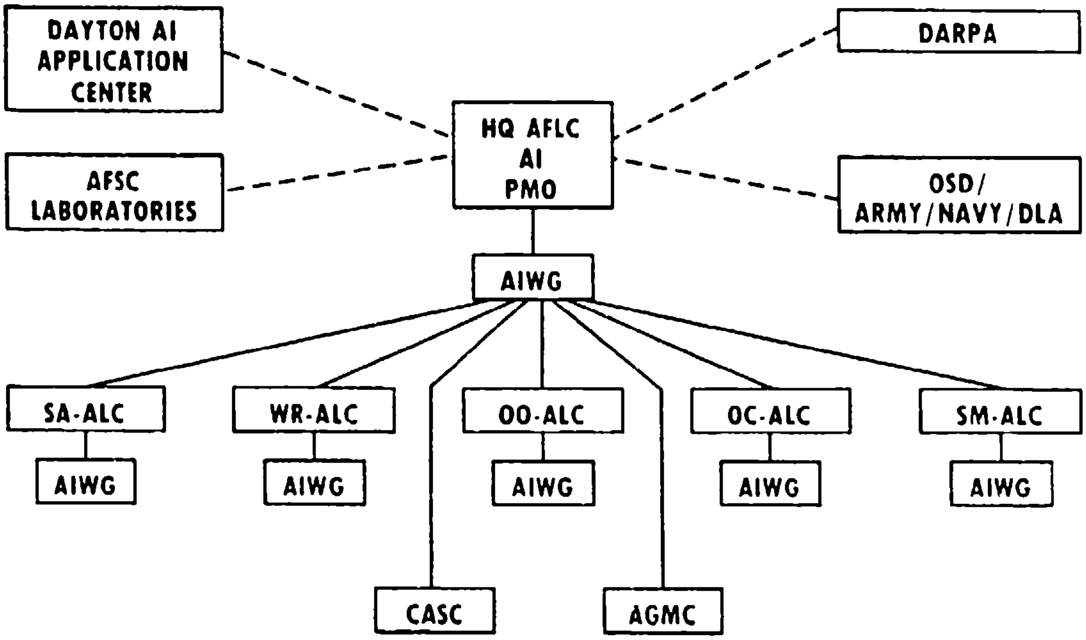

Fig 65. AI Organizational Networks Within AFLC.

other logistics resource management functions should be focused on those capabilities that are critical to implementation of AFLOGCON. The AI Program Management Office, as shown in Fig 64, is in an excellent position to shift AI technology in this direction by filtering user requirements by that criterion.

Moreover, the organizational AI networks that presently exist within DOD and industry provide an excellent mechanism for integrating the decision-support technology required under AFLOGCON. By tying AI working groups (AIWG) and related management information systems development activities to the system integration offices proposed for AFLOGCON, AI initiatives can be

coordinated effectively with other structural changes to the logistics system.

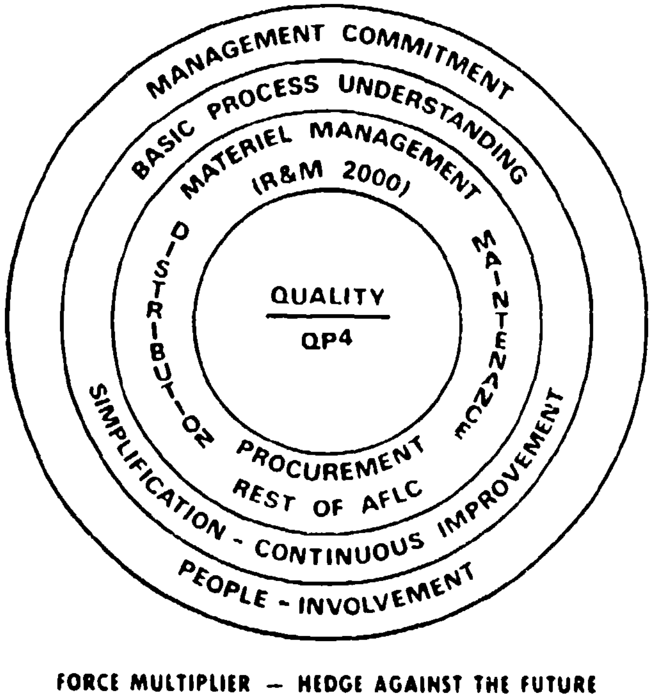

Fig 66. AFLC's Quality Model. (95:3)

The second initiative that cuts across all functions and processes of AFLC is the result of General Hansen's over-riding concern to improve quality within the Command. Basic to providing combat strength through logistics, quality is key to supplying "the kinds of goods and services the combat commanders can rely on to do the job." (93:4) An outgrowth of the Air Force's emphasis to increase R&M and to extract more combat capability from the dwindling resources available for defense, quality is now managed by Colonel John C. Reynolds, Assistant to the Commander for Quality Programs, who is responsible for all quality programs within AFLC. Mirror imaged at the ALC, this organizational arrangement merged the traditional,

production-oriented quality assurance function of the Command with the management resources applied to R&M 2000 initiatives and other related programs. As the cornerstone for all AFLC actions, this program seeks to attack management improvements under a concept that stresses Quality equals People plus Process plus Product plus Performance--QP^4.

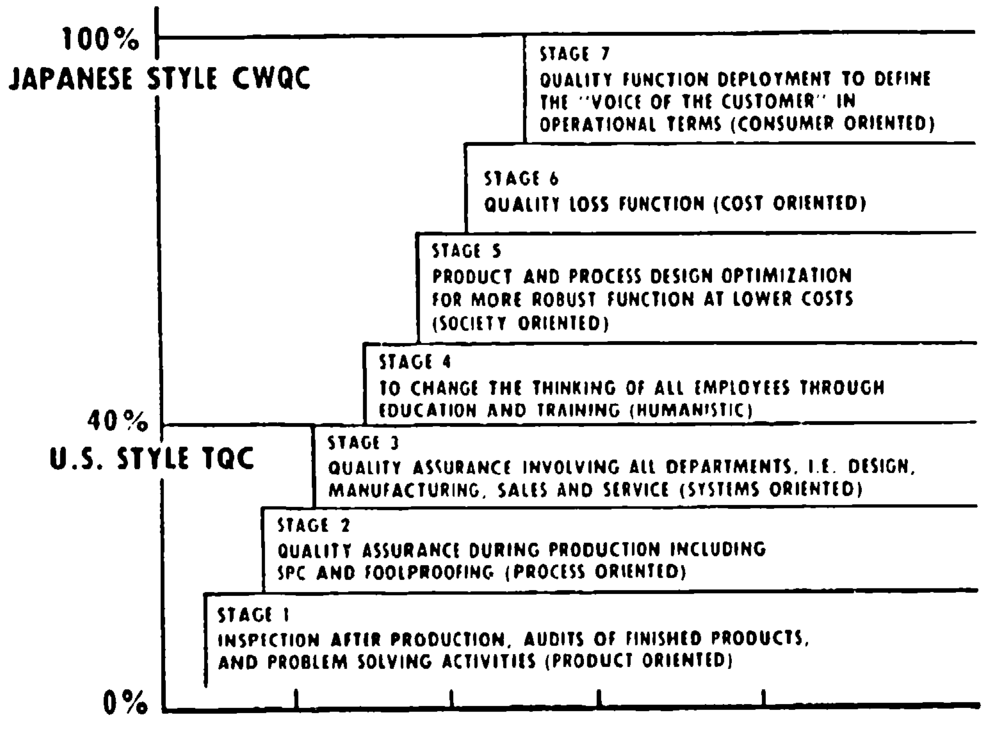

Fig 67. AFLC's Seven Stage Quality Improvement Program. (95:6)

Illustrated in Fig 66, this approach parallels widespread industry recognition in recent years that Total Quality Control (TQC) is a key factor in many buying decisions. It is also one of the primary reasons for Japanese success in world markets.[90] AFLC will seek to apply QP^4 as shown in Fig 67.

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[90] "Dr W. Edwards Deming, one of the pioneers of SQC or Statistical Quality

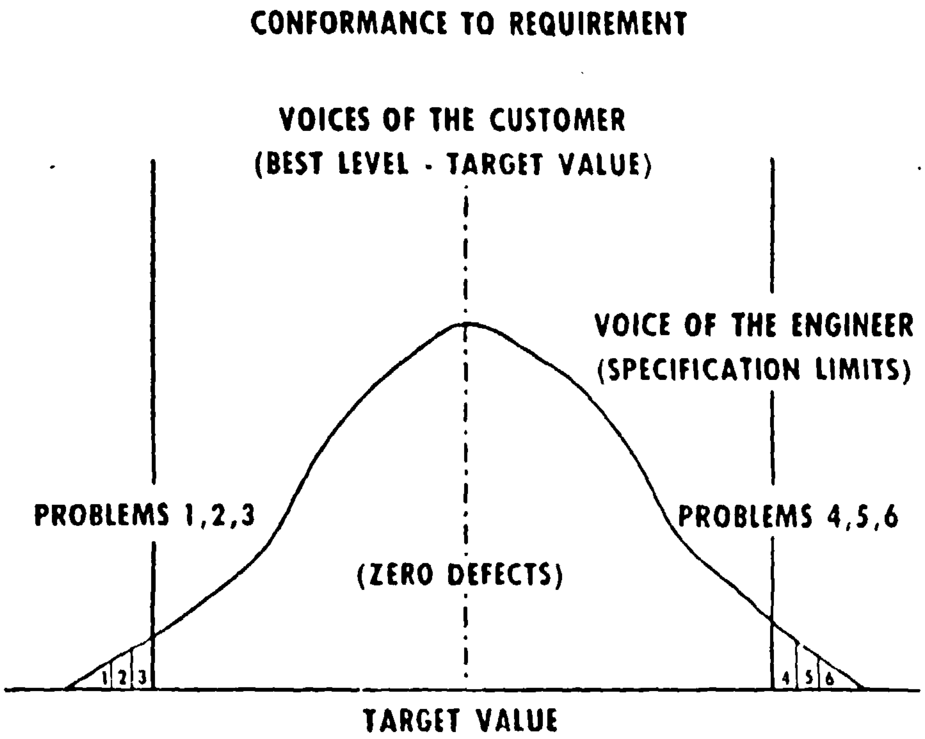

Fig 68. Traditional Quality Control Performance. (95:7)

To better understand what AFLC's QP[4] is trying to achieve and how it relates to AFLOGCON, a look at the traditional approach to quality control is in order. Depicted in Fig 68, US manufacturers and organic repair activities within DOD have geared their production lines to achieve a

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90 (Con't) Control and the man most responsible for Japan's success in leading the world in terms of quality teaches that 85% of the problems we encounter lie in the processes we use to get things done." The solution to better quality is not to tell people to do better work or add inspections that check or recheck their work, but to improve the overall process by which the final products are produced. (94:3)

quality control program that varies between the upper and lower limits of acceptance establ ed y engineering specifications. Deviations from this zero defect target value, normally fall within these extremes as reflected by the normal distribution curve.

Assessments of Japanese quality control procedures interestingly found that high reliability and maintainability were, in most cases, not due to improved product design. Instead, it was attributed to tighter specifications that narrowed the Japanese's acceptable deviation around the zero defect target value. The lower variance from the target value increased the compatibility of component parts. The improved fit and conformity were found to be the main reason for the higher lifespan of Japanese products. (97:1)

The application of similar quality control techniques by AFLC's repair and manufacturing activities holds the same potential for increasing the overall service life of SRUs, LRUs, subsystems, and in turn, weapon systems without costly redesign and retrofit programs. Comparable performance improvements can be gained by applying this concept to the Air Force logistics system. Under AFLOGCON, significant increases in weapon system capability can be achieved simply by ensuring that critical elements of the logistics system are effectively "meshed" along these lines. More importantly, however, AFLOGCON establishes the capability required to ensure that the resources available within a theater of operation, and at the depots, can be fully exploited under peace and wartime conditions. Rapid and effective reprogramming actions in response to changing operational needs are the key to high performance in this area.

PART V. THE BOTTOM LINE

Conclusions

The Air Force logistics system is presently not structured to effectively utilize available resources in peace and war. This deficiency has been recognized by senior logisticians and corrective action is underway. The basic problem centers on the absence of a clearly articulated logistics concept of operations. Forces today must compete for logistics support at the unit level on essentially a "first come, first serve" basis within broad priority groupings that are insensitive to rapid changes in resource status, operational priorities, and the overall needs of the combatant CINCs. The growing complexity of modern weapon and support systems compounds the problem.

The dynamic nature of peacetime and wartime operations demands that the logistics system be flexible and responsive to urgent operational needs. Prepositioned WRM and maximum base self-sufficiency have traditionally been the solution. Peacetime operations and simulated combat activities have demonstrated that this logistics concept of operations is inefficient in peace and totally inadequate in war. To be effective under these conditions, vital elements of the logistics system must be more sensitive to the near-term needs of those operational units that are of the greatest importance to the combatant CINCs.

Present state-of-the-art technology makes it possible to establish survivable C2 networks linking operational units, regional command posts, and worldwide logistics operations centers. Such a capability will ensure the minimum connectivity required to maintain critical information flows between and among decision makers at all levels of the logistics system. Resource prioritization, allocation, and execution tools are rapidly approaching the capability to provide combat commanders with regional

weapon system assessments of alternative courses of action. Critical information required for execution of operations orders can be made available to regional and depot decision makers. Specific distribution and repair actions at each of these levels can be integrated via WIS to optimize available resources on a weapon system and force basis. Changes in operational programs can be worked in real time if communication links are hardened, and networked with regenerating nodes. Minimum changes to existing intra- and inter-theater transportation are required to complement C2 with assured movement of critical non-unit cargo. Depot resource allocation/execution tools, such as DRIVE, have demonstrated through actual operations that significant gains in aircraft availability can be realized by applying critical depot skills and resources to the highest operational priorities in the field.

Implementation of AFLOGCON requires a major cultural change, however, to the way logistics decision makers at all levels of the logistics system prioritize and allocate their time and available resources. Broad priority schemes that enhance goal congruence across functional lines, weapon system or product lines, and organizational boundaries are required to effectively utilize scarce resources in peace and under the highly uncertain, dynamic environment of war. To meet that need, AFLOGCON provides a broad overarching concept of operations that can effectively guide the structural changes that must be made to the Air Force logistics system. This approach is similar to the process an aeronautical engineer goes through to design a new aircraft. Instead of putting the best available engine, fuselage, landing gear, control system, and other components together, the engineer must first visualize the craft as a whole and then "adapt or modify the best available components or parts and operationally relate them to the others. In this process of adjustment some of the best parts become 'spoiled.' This is the only known way of making components function

together" as a functioning whole--an operationally effective system. (48:8)

Recommendation

Every effort should be made to implement AFLOGCON as soon as possible to ensure that the Air Force logistics system can fully carry out its mission under any and all conditions. To do that, however, requires a thorough understanding of the nature of the existing system deficiencies. This paper attempts to establish a basic framework for this purpose. Specific recommendations regarding implementation of AFLOGCON are provided throughout this paper for each area of the program. A summary of the more important recommendations follows:

* A formal "blueprint" conveying basic relationships between base or unit-level, regional, depot, and industry logistics C2 activities should be published in strategic planning directives to ensure that the logistics concept of operations is adequately documented. Corporate review of AFLOGCON status should be required at all levels of command to keep the concept current. Strategic planning should be consistent with Fig 21.

* AFLOGCON snould be institutionalized as the single fundamental criterion for evaluating changes to the logistics system Air Force-wide. An order of priority as illustrated in Figures 27, 30, and 31 should be considered for this purpose.

* An AFLC System Integration Office for AFLOGCON should be established within the Directorate of Plans (XPX) as illustrated in Fig 23. Similar SIOs should be established at HQ USAF and major SOAs/MAJCOMs/DRUs involved in AFLOGCON implementation. These SIOs should be interfaced with all major planning functions (e.g., XO, RD, etc).

* A master plan for AFLOGCON implementation within AFLC should be published to control strategic initiatives. The condensed, executive format used in the CLOUT Action Plan should be adapted to streamline the control process.

* Development and implementation of DRIVE by the WSMIS SPO should be the baseline for future expansion of aircraft availability/force capability prioritization techniques to other critical commodities, such as SE, fuels, munitions, etc.

* Regional resource prioritization/allocation mechanisms should be established in major CONUS regions and other theaters of operations to effect cultural change from item and weapon system management to area-oriented operations. The logic illustrated in Fig 35 and Fig 36 should be applied.

* A standard Air Force-wide numerical ranking criteria should be established for primary operating locations in CONUS and overseas regions. Regional control centers should be linked via WIS to the ALCs, and their "neighbors" to improve asset utilization within and across regions.

* Standard DRIVE-like decision tools should be developed and implemented at regional and worldwide logistics control centers to utilize advanced resource allocation techniques in the near future. The logistics C3 concept of operations illustrated in Fig 42 should be modified for this purpose.

* Standard Regional logistic command and control centers should be established in major regions and theaters of operations, and patterned

after the Logistics C3 System architecture illustrated in Fig 44.

* The criticality and value of regional distribution systems (such as LDS and PDS) to peacetime readiness and wartime sustainability of Air Force, and other friendly forces, in combat areas of operations should be briefed to senior OSD and congressional staff with the objective of securing support for standard joint service/agency regional control mechanisms.

* A joint OSD/HQ USAF/MAJCOM network of Air Force SIOs should be established to enhance integration of AFLOGCON implementation actions. The AI network shown in Fig 64 and the existing EDS UNIX network should be considered for this purpose.

* AFLC strategic planning actions should focus on establishing clear relationships between AFLOGCON and those functions and initiatives that are not considered at present to be within the scope of the logistics elements of AFLOGCON.

* The standard Air Force ADP architecture should utilize the relational data base concept developed by the LIMSS Program Office. It should also draw on the "cross-cutting" functional expertise of the ADS SPO to determine a practical method for implementing standard software/hardware interfaces for regional C2 systems.

APPENDICES

Concept of Operations for Depot Support

Statement of Need. Basic aerospace and combat support doctrine recognize that success in warfare depends on getting sufficient men and machines in the right position at the right time with the necessary wherewithal to counter the enemy threat. AFLC's mission is to provide logistics support to the Air Force and other warfighting organizations. In that role, AFLC must supply the materiel and services required to maintain operational forces in a high state of readiness during peace and be prepared to sustain deployment and war plan execution for as long as necessary.

Experience has shown that peacetime demands for critical weapon and support system resources drastically fluctuate over time and across worldwide operating locations. Compounded by wartime losses and disruption to the logistics system, these uncertainties make it virtually impossible to accurately and reliably predict where, when, and how much prepositioned materiel specific operating units will need to successfully carry out their wartime mission. Our inability to determine these requirements with reasonable confidence challenges the basic assumption that prepositioned material can carry combat units through the initial period of hostility until normal supply is re-established.

Today's logistics system fails to effectively deal with the highly uncertain and dynamic environment our forces face. Moreover, a general consensus exists that the theater and depot elements of the logistics system are not as flexible and responsive as they need to be. This situation will continue until the logistics system is restructured to effectively react to unpredictable fluctuations in demand at the unit level. The logistics system must be able to rapidly reallocate critical theater and depot resources in response to changing operational priorities

in order to achieve and sustain maximum combat capability in the fluid and highly dynamic environment of war.

The logistics system is also subject to continuous modification over time to ensure effective operational support of new weapon and support systems that are phased into the force structure to meet the threat. The application of advanced technology to logistics processes and changes to the Air Force infrastructure are of paramount concern to ensure continuity of logistics operations in the outyears.

General Concept Of Operations. To the extent possible, the full range of depot activities, including materiel management, depot maintenance, distribution, and acquisition functions, must be prioritized against critical near-term theater requirements. This can be done through resource balancing models (e.g., DRIVE, WSMIS, WSMIS/REALM, and AAM) that optimize existing and future resource expenditures in terms of maximum weapon system capability at the unit level. When specific operational goals cannot be directly related to a logistics function, corporate priority must be established based on its contribution to direct combat capability (1) at the base-level, (2) the region or theater-level, and (3) the depot-level of the logistics system--with higher priority placed on near-term (versus long-term) improvements in each category.

Under the Air Force logistics concept of operations, key elements of the logistics system must be linked on a real-time basis in direct support of near-term combat operations; be capable of supporting peace and wartime forces under highly dynamic operating conditions; be flexible, responsive, and survivable to ensure quick recovery from hostile actions resulting in combat loss, damage, or disruption to key logistics resources; and be able to rapidly reallocate and apply critical logistics resources to the highest

priority requirements of theater commanders. AFLC initiatives will seek to improve vertical and horizontal integration of planning, programming, and execution actions at all levels of the logistics system.

The operational priorities established for combat units will be the primary basis for determining resource, skill mix, and workload allocation. Available resources will be applied to gain and sustain the highest combat capability in terms of weapon system availability goals at worldwide locations. As unpredicted fluctuations in demands are encountered in the field, available resources in the region or theater of operation should be applied to the highest priority needs. AFLC support decisions must complement actions taken in the region or theater.

Serviceable supplies and materiel must be redistributed among fixed bases and other operating sites to meet the most urgent needs. Lateral repair within the region or theater of operation will be the next source of supply. Critical resource shortfalls that cannot be satisfied by regional or theater sources must be provided by the depot as quickly as possible before and during the onset of hostilities. The use of DRIVE-like resource allocation tools for lateral supply and mutual repair within the region or theater will be pursued as DRIVE is refined and expanded to other commodities at the depot.

Regional redistribution systems (e.g., EDS, PDS, and LOGAIR) should be modified as necessary to provide adequate forward storage/distribution points and responsive intra-theater transportation under highly uncertain conditions. Similarly, planned wartime movement priorities, transportation modes, and in-transit controls must be adjusted to ensure responsive inter-theater transportation for critical non-unit cargo requirements during the initial period of war (D to D+30). Retrograde shipments to the depot must

be tailored to specific war plan scenarios and expedited to reduce depot repair turn-time of critical unserviceable materiel.

A LOG C3 system must be established to capture, process, and flow critical information required for resource allocation/balancing decisions under combat conditions to region/theater and depot decision-makers. Non-essential elements of information must be cut off at the onset of hostilities. Status of critical resources, revised operating programs, and up-to-date base/unit priorities are among the essential elements of information required by theater and depot decision-makers. This system must be flexible, redundant, and augment management information systems (e.g., WSMIS, SC&D, CAMS, and SBSS) at the base and depot-level during peacetime operations.

The high volumes of rapidly changing demands expected under wartime conditions may saturate the logistics system and significantly impair critical resource decisions at the depot and theater level. Automated resource balancing techniques, featuring dynamic simulation of theater and depot logistics requirements, can provide real-time decision-support under such conditions. Through continuous surveillance of critical changes in the operating environment, the LOG C3 system will make it possible to uniformly prioritize theater and depot logistics actions and optimally allocate available resources consistent with near-term weapon system availability goals in the battlefield. When it goes blind, proactive modeling techniques must be in place to take up the slack. AFLC is developing DRIVE as a command resource allocation tool, defining non-essential information elements, and base/depot system interface requirements from this perspective.

Selected Cybernetic Findings

"A system tends to distort information in a direction that will make it more likely to elicit rewards or less likely to elicit punishment to itself."

"In general, the farther components of a system are from one another and the longer the channels between them are, the less is the rate of information flow among them."

"The farther away along channels a component is from a process, or components there are between them, the more error there is in its information about that process."

"A system never completely compensates for the distortion in information flow in its channels . . . 'People typically do not appreciate how prejudiced they in fact are.' This is supported "by findings that people who are by objective test more prejudiced than the average tend to believe that they are only average or less than average in prejudice. Those who are objectively less prejudiced overwhelmingly believe they lack prejudice."

"Use of multiple parallel channels to carry identical information, which further along in the net can be compared for accuracy, is commoner in more essential components of a system than in less essential ones." (68:96)

"Two-way channels which permit feedback improve performance by facilitating processes that reduce error."

"In periods of stress and/or change in a system, the amount of information process relevant to both task performance and adjustments among subsystems increases."

"As the noise in a channel increases, a system encodes with increasing redundancy in order to reduce error in the transmission. If messages are so coded that they are transmitted twice, errors can be detected by

comparing every part of the first message with every part of the second, but which of the two alternative transmissions is correct cannot be determined. If they are transmitted three times, they can be both detected and corrected by accepting the alternative on which two of the three transmissions agree." (68:98)

"As the strength of a strain increases, information inputs will more and more be interpreted (or decoded) as required to reduce the strain."

"A system does not form associations without (a) feedback as to whether the new output relieves strains or solves problems and (b) reinforcement (i.e., strain reduction by the output)."

"In systems which survive, the component with the most relevant information available to its decider is the one most likely to exercise power over or elicit compliance from other components in the system." (68:100)

"The longer a decider exists, the more likely it is to resist change."

"A decision about an information input is not made absolutely but with respect to some other information which constitutes a frame of reference with which it can be compared. Neural response to a new input is based on how much it is a change from the previous input. A person judges weights by comparison with previously lifted weights. Groups judge the personal characteristics of members of other groups by the norms of their own group."

"A system that survives generally decides to use first the adjustment processes which can be most immediately applied to relieve a threat or a strain produced by a stress and later those which are less quickly available."

"A system cannot survive unless it makes decisions that maintain the functions of all of its subsystems at a sufficiently high efficiency and their costs at a sufficiently low level that there are more than enough resources to keep it operating satisfactorily. Dinosaurs became extinct

when they grew too large to function in their environments. Their moving was probably too slow for them to survive in the presence of faster antagonists and their skeletons may have been too weak to support their bulk. The medieval knight's armor ultimately became so heavy that an unarmored footman with bow and arrow could destroy him even thou he had the advantage of a horse and armor; the boundary artifact protected him but at the cost of too greatly slowing his ability to maneuver. Some heavy World War II army tanks similarly exchanged mobility for thicker armor and consequently were more vulnerable than more maneuverable, lighter tanks." (68:101)

"The higher the level of a system the more correct or adaptive its decisions are . . . A number of studies with varying research designs have showed that majority or pooled judgments are more correct than the average individual judgments and equal to the superior individual working alone . . . Groups have available a broader range of relevant information and also have a more flexible approach to decision-making because members differ in their problem solving styles . . . Groups are more willing to make riskier decisions than individuals . . . Group discussion alone without decision has been shown in other experimentation to make the leader shift to a riskier position." (68:102)

"The answer of man the manager to this problem is precisely organization. Proliferating variety is held in check by our organizational refusal to consider more than a tiny part of the problem at once. Nor will we normally consider more that one time epoch at the moment of decision. Any who tries to look more than a week or so ahead is likely to be written off as a visionary. Thus are great issues reduced to a scale with which our cranial computers feel they can cope." (45:59)

"The scientific apparatus required to understand, design and regulate large viable systems is becoming available. It is this very apparatus, based on a corpus of knowledge, of which the management community stands most in need. For <u>if cybernetics is the science of control, management is the profession of control</u>." (45:105)

"The beginning of wisdom for management at any level is the realization that viable systems are, in large measure, self-regulating and even self-organizing . . . Cybernetics reveals the nature of these natural phenomena. It must do so, if it is to help at all. For although management must accept responsibility for everything that happens, it cannot assume direct autocratic control of everything that happens. The systems concerned are just too big." (45:106)

"We ought to use the self-organizing propensities of the string of esoteric boxes, and to harness their professionalism, knowledge and energy. To do this, we have to create an environment in which these boxes do not turn defensively inward, using up their potency in internal squabbles and the effort to inhibit change. Instead, we create a metastructure and supply a metalanguage so that the organizing power of the boxes themselves is released to give change effect. This means that whatever is the 'superior authority' in any given social situation operates like a judo expert--who uses his opponent's energy, rather than his own, to achieve his ends." (45:148)

"I think it is a major cybernetic conclusion to draw from these remarks that managers generally approach this problem in the wrong way. They usually try to intervene in the equilibrial processes of the self-regulating system--thereby, perhaps, making it fundamentally unstable. The sensible course for the manager is not to try to change the system's internal behaviour, which typically results in mammoth oscillation, but to change its structure--so that its natural systemic behaviour becomes different. All of this says that management is not so much part of the system managed as it is the system's own designer." (45:106)

"I call it an esoteric box, a black box if you will. What is going on inside this box is an established order of things: things accepted as mores of the box, things professional, things historical, and so on. There is a complex arrangement of sub-systems, a strange set of relationships between people of standing inside the box, and a recondite way of behaving. These features--their complexity and unintelligibility to the outsider--justify the box's adjective 'esoteric'. Admission to the box's activity cannot be

gained without the appropriate passport. But the box is not a closed system, it is part of society; it certainly has inputs and outputs. Even so it is internally and autonomously self-organizing and self-regulating. And although the box processes whatever it exists to affect (and this is often people), that which is processed does not change the box at all. The box goes on; it is very powerfully organized to maintain its own internal stability, and therefore its survival as an integral institution." (45:227)

"Another fundamental cybernetic principle: Ashby's Law of Requisite Variety. Variety is the cybernetic measure of complexity. It is explicitly the possible number of states of a system. The law says that the variety of a given situation can be managed adequately only by control mechanisms having at least as great a capacity to generate variety themselves." (45:231)

"It is characteristic of man's way of thinking to contemplate entities rather than systems; to disconnect systems rather that to relate their parts; to record inputs and outputs to systems rather than to measure systemic behaviour itself. When it comes to managing affairs, we characteristically try to deal with that dismantled system--piece by piece--rather than to redesign the totality so that it actually works." (45:309)

"Information is what changes us; information constitutes control. But to make that work requires a science of effective organization, called cybernetics." (45:320)

> "But I want to attest to the truth
> that simplicity
> is always the answer.
> We do not see it
> because we search for it
> in the wrong language." (45:376)

"Any viable institution has two major characteristics. First of all, it is stable. But the ultimately stable state for any system is death.

Therefore its second vital characteristic is that it remains adaptable." (45:403)

"The full-scale handling of proliferating variety is completely impossible for the brain of the man or for the brain of the firm. Yet both men and firms actually work. They do so, they must do so, by chopping down variety on a mammoth scale. It takes more than an act of faith in electronic computers to achieve this. The question is: how does a system conveniently and effectively undertake this fearful task? The answer is: by organization." (61:65)

"The vital point is that mutations in the outcome should always be allowed. Error, controlled to a reasonable level, is not the absolute enemy we have been taught to think it. On the contrary, it is a precondition of survival." (61:82)

"If a division of the firm were really and truly autonomous it would not be part of the firm at all. In the same way, if the heart or the liver were really and truly autonomous, they might decide to renegue on the body. On the other hand if the heart and liver were not more or less autonomous, we would have to remember to tell them what to do all the time--and we would be dead in ten minutes. In the same way, if a division of the firm is not more or less autonomous, the main board has to run it directly--which is equally impossible." (61:100)

"Uncertainty, as we have seen, is a function of variety. Variety is a measure of the number of possible states of the system. A decision is the selection of one possible state from all the others." (61:267)

"The existence of redundancy is a powerful protective mechanism in circumstances where the organization is computing with unreliable components." (61:291)

"Perhaps the most important of the cybernetic techniques is an ability to handle the notion of a black Box. This Box stands for the control mechanism of the system; it is called 'black' because it is unknown in its

operational details. This concept is vital, because cybernetic systems are exceedingly complex, and their controls cannot be defined in specific detail. If they are to be described, imitated and controlled a method which explicitly recognises this is essential. The behaviour of a black Box is studied by discovering the logical and statistical relationships which hold between the information that goes into the Box and the instructions that come out." (69:8)

"Every system does something, and what it does can be regarded as the purpose of the system. Control is the system's strategy for achieving that purpose." (69:7)

"In a homeostat a critical variable is held at a desirable level by a self-regulatory mechanism. It is not even meaningful to say that the value for this critical level must be invariable; with the remarkable exceptions of those few natural physical constants that guarantee the logical continuity of the universe, values found in nature may be expected to vary. What is important to a natural control system is that the variation occur within physiological limits. This means to say the value is always at its mean desired level to a known standard of approximation, and that there is a compensatory mechanism in the system which edges it back towards that mean whenever it begins to wander away. And so, with homeostasis, we encounter the vital principle of self-regulation." (69:23)

"The manager wants information, not facts, and facts become information only when something is changed. The manager is the instrument of change (otherwise what is he doing?) which is to say his job is that of control. This means that the job is not to design a data-processing system at all, but to design a control system. And if we use the computer simply to undertake a souped-up version of the old kind of control system, which was inadequate simply because we did not have computers, we are no better off than before. It is the same with our planning techniques, which are part of the manager's control armoury, and which so desperately need to be improved in the context of technological change. For again we are concentrating on slicker ways of doing things rather than on what we do. What is the use of the ever-faster, ever-slicker, more nearly perfect

implementation of rotten plans?" (69:31)

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Glossary

AC	Comptroller
AAC	Alaskan Air Command
AAM	Aircraft Availability Model
ACIN	Automated Critical Item Network
ADP	Automated Data Processing
ADS	Assured Distribution System
AFALC	Air Force Acquisition Logistics Center
AFALMC	Air Force Logistics Management Center
AFB	Air Force Base
AFCAP	Air Force Capability Assessment Program
AFCC	Air Force Communications Command
AFLC	Air Force Logistics Command
AFLCR	AFLC Regulation
AFLOGCON	Air Force Logistics Concept of Operations
AFM	Air Force Manual
AFR	Air Force Regulation
AFSC	Air Force Systems Command
AI	Artificial Intelligence
AIS	Avionics Intermediate Maintenance Shop
ALC	Air Logistics Center
ALG	Deputy Assistant Secretary (Logistics & Communications)
ALS	Advanced Logistics System
AMC	Army Materiel Command
AOR	Area Of Responsibility
APOD	Aerial Port Of Debarkation
APOE	Aerial Port Of Embarkation
AS	Air Station
ASB	AFLC Staff Board
ASC	AUTODIN Switching Center
ASD	Assistant Secretary of Defense
ATE	Automated Test Equipment
AUTODIN	Automated Digital Information Network
AWP	Awaiting Parts
BLSS	Base Level Self-sufficiency System
BOA	Board of Advisors
BRC	Base Repair Cycle
BSMS	Battle Staff Management System
C2	Command and Control
C3	Command, Control, and Communications
C3I	Command, Control, Communications and Intelligence
C4S	Command, Control, Communications, and Computer Systems
CAMS	Core Automated Maintenance System
CAS	Combat Ammunition System
CC	Commander
CCASE	Combat Communications Access for Support Elements
CDMS	Contract Data Management System
CE	Communications-Electronics
CENTCOM	Central Command
CFMS	Combat Fuels Management System

CFOSK	Combat Follow On Support Kit
CFOSS	Combat Follow-On Supply System
CLOUT	Coupling Logistics to Operations to Meet Uncertainty and the Threat
CMOS	Cargo Movement Operation System
CMS	Cargo Movement System
CINC	Commander In Chief
CIP	Critical Item Program
COB	Colocated Operating Base
COMO	Combat Oriented Maintenance Organization
COMPES	Contingency Operation Mobility Planning Executive System
CONUS	Continental United States
COSO	Combat Oriented Supply Organization
CRAF	Civil Reserve Air Fleet
CS	Chief of Staff
CSAF	Air Force Chief of Staff
CSC3	Combat Support Command Control and Communications
CSL	Combat Support Laboratory
CSMS	Combat Supply Management System
CSS	Combat Support System
DAAS	Defense Automatic Addressing System
DCA	Defense Communication Agency
DCP	Decision Coordinating Paper
DCS	Defense Communications System
DCS	Deputy Chief of Staff
DCSS	Deployed Combat Supply System
DDN	Defense Data Network
DFCS	Deployment Flow Computer System
DG	Defense Guidance
DIFM	Due In From Maintenance
DLA	Defense Logistics Agency
DLM	Depot Level Maintenance
DMMIS	Depot Maintenance Management Information System
DMSK	Depot Maintenance Spares Kit
D028	Air Force Central Leveling System
D029	WRSK/BLSS Authorization System
D035	Item Manager Wholesale Requisition System
D041	Recoverable Consumption Item Requirement System
D049	Master Material Support Record System
D062	Economic Order Quantity Buy/Budget Computation System
D073	Repair Requirements Computation System
D143A	Central Edit, Index, and Routing System
D143H	Central Knowledge Subsystem
D165A	Mission Capability Requisition Status System
D165B	Aerospace Vehicle and Selected Items of Equipment Mission Capability Requisition Status System
DOC	Designed Operational Capability
DOD	Department of Defense
DOT	Department of Transportation
DPEM	Depot Purchased Equipment Maintenance
DRC	Dynamic Research Corporation
DRIVE	Distribution and Repair In Variable Environments
DRU	Air Force Direct Reporting Unit

DS	Distribution
DSARC	Defense System Acquisition Review Council
DSIO	Defense Spares Initiatives Office
DSO	Direct Support Objective
DTS	Defense Transportation System
Dyna-METRIC	Dynamic Multi-Echelon Technique for Recoverable Item Control
Dyna-SCORE	Dynamic Simulation of Constrained Repair
ECM	Electronic Counter Measures
EDS	European Distribution System
ELCAM	Expected-value-based Logistics Capability Assessment Model
ESD	Electronics Systems Division
ETADS	Enhanced Transportation Automated Data System
FAD	Force Activity Designator
FIO	Functional Integration Office
FMS	Foreign Military Sales
FOL	Forward Operating Location
FOSK	Follow On Support Kit
FSS	Forward Supply System
FORCESTAT	Force Status
GDSS	Global Decision Support System
GM	General Manager
G004L	Job Order Production Master System
G019C	MISTR Requirements Scheduling and Analysis System
GS	General Series
HASC	House Armed Services Committee
ICPCN	Inter Command Post Communication Network
IM	Item Manager
IPS	Information Processing System
IRD	Infrastructure Requirements Document
ISAMPS	Industrial Surge and Mobilization Planning System
IWSM	Integrated Weapon System Management
JCS	Joint Chiefs of Staff
JDC	Joint Deployment Community
JDS	Joint Deployment System
JEIM	Jet Engine Intermediate Maintenance
JOPES	Joint Operational Planning and Execution System
JOPS	Joint Operational Planning System
J041	Acquisition and Due In
JSCP	Joint Strategic Capabilities Plan
LAN	Local Area Network
LCCEP	Logistics Civilian Career Enhancement Program
LCOM	Logistics Composite Model
LE	Logistics and Engineering
LG	Logistics
LIMSS	Logistics Information Management Support System
LMC	Logistics Management Center
LMS	Logistics Management Systems

LMSC	Logistics Management Systems Center
LMC	Logistics Management Center
LOC	Logistics Operations Center
LOGAIR	Logistics Airlift
LOG C2	Logistics Command and Control
LOG C3I	Logistics Command, Control, Communication, and Intelligence
LRC	Logistics Readiness Center
LRU	Line Replaceable Unit
LSP	Logistics Support Priorities
LIMSS	Logistics Information Management Support System
MA	Maintenance
MAISARC	Major Acquisition Information System Advisory Review Council
MAC	Military Airlift Command
MAJCOM	Major Comma Mission Design Series
MIC	Maintenance Inventory Center
MICAP	Mission Capability
MIEC	Mission Item Essentiality Code
MILSTEP	Military Supply and Transportation Evaluation Procedures
MILSTRIP	Military Standard Requisitioning and Issue Procedures
MILSTAMP	Military Standard Transportation and Movement Procedures
MISTR	Management of Items Subject To Repair
MM	Materiel Management
MOB	Main Operating Base
MRA	Mission Ready Aircraft
MSK	Mission Support Kit
NCA	National Command Authority
NFMC	Not Fully Mission Capable
NMC	Naval Materiel Command
NRTS	Not Reparable This Station
O&M	Operations and Maintenance
OIM	Organizational Intermediate Maintenance
OPLAN	Operations Plan
ORC	Operational Readiness Center
O&ST	Order and Ship Time
OSC	Operational Support Center
OSD	Office of the Secretary of Defense
PA	Aerospace Vehicle and Flying Hour Document
PAA	Primary Aircraft Authorized
PACAF	Pacific Air Forces
PARC	Planning and Requirements Committee
PD	USAF Bases, Units, and Priorities Document
PDN	Public Data Network
PDP	Program Decision Package
PDS	Pacific Distribution System
PE	Program Element
PEM	Program Element Monitor
PEO	Program Executive Officer
PIO	Program Integration Office
PIPD	Planning Input for Program Development
P&L	Production and Logistics

PLSC	Pacific Logistics Support Center
PM	Program Contracting and Manufacturing
PMD	Program Management Directives
POM	Program Objective Memorandum
POS	Peacetime Operating Stock
PRIME BEEF	Prime Base Engineer Emergency Force
PRIME RIBS	Prime Ready In-Base Services
PSN	Public Switch Network
QP	Assistant to the Commander for Quality
RAM	Readiness Assessment Module
RC	Technology Repair Center
RCCS	Reclassification, Classification, Collection, and Salvage
RDB	Requirements Data Bank
RDJTF	Rapid Deployment Joint Task Force
RDT&E	Research, Development, Test, and Evaluation
REALM	Requirements/Execution Availability Logistics Module
RED HORSE	Rapid Engineer Deployable, Heavy Operational Repair Squadron, Engineer
RD	Research and Development
R&D	Research and Development
R&M	Reliability and Maintainability
R&S	Reliability and Sustainability
RMC	Resource Management Center
ROI	Return On Investment
RPC	Robusting Priority Code
RRSC	Rivet Repair Steering Committee
SAB	Scientific Advisory Board
SAC	Strategic Air Command
SAF	Secretary of the Air Force
SAM	Sustainability Assessment Model
SASC	Senate Armed Services Committee
SBSS	Standard Base Supply System
SC	Communications Computer Systems
SC&D	Stock Control and Distribution System
SCE	Support Center Europe
SCP	Support Center Pacific
SE	Support Equipment
SIO	Systems Integration Office
SM	System Management
SOA	Separate Operating Activities
SON	Statements of Need
SORTS	Status of Resources and Training Systems
SOUTHCOM	Southern Command
SPACECOM	Space Command
SPM	System Program Manager
SPO	System Program Office
SSC	Standard Systems Center
TAC	Tactical Air Command
TACAIR	Tactical Air
TAF	Tactical Air Forces

TDS	Tactical Data Station
TFW	Tactical Fighter Wing
TPFDL	Time Phased Force Deployment List
TRANSCOM	Transportation Command
TRAP	Tanks, Racks, Adaptors, and Pylons
TRC	Technology Repair Center
TRU	Test Replaceable Unit
TSAR	Theater Simulation of Airbase Resources
TSARINA	TSAR INputs using AIDA (AIr base Damage Assessment)
TSC	Transportation Systems Center
TSS	Transportable Supply System
UJC	Urgency Justification Code
UNITREP	Unit Reporting
UMMIPS	Uniform Materiel Movement and Issue Priority System
UND	Urgency of Need Designator
USAF	United States Air Force
USAFE	United States Air Forces in Europe
VSL	Variable Safety Level
VTMR	Variance To Mean Ratio
WIS	WWMCCS Information System
WRM	War Reserve Materiel
WRSK	War Readiness Spares Kit
WSMIS	Weapons System Management Information System
WWMCCS	World Wide Military Command and Control System
WSDP	Wholesale Storage Distribution Point
XO	Plans and Operations
XP	Plans and Programs
XPC	CLOUT Program Office
XPX	Directorate of Plans
XPXC	Concept, Doctrine, and Management Support Division
XPXD	Mission Assignments Division
XPXL	Logistics Operations Division
XPXO	Advanced Planning Division *
XPXP	Concept, Doctrine, Objectives Plans Division *
XPXQ	Operational Requirements Division **

* These Divisions were redesignated as XPXM - Studies Policy Management Support Division and the XPXP - Concept, Doctrine, Objectives Plans Division in March 1988.

** Renamed the Infrastructure Requirements Division in March 1988.

A Tribute to Major General Edward R. Bracken...
The father of the Air Force Logistics Command's
CLOUT Program Office.

Deputy Chief of Staff
Plans and Programs
January 1986 - July 1987

About the Author

A native West German, Mr Seaquist emigrated to the United States in 1956 at the age of 10. This move effectively severed most of the cultural, social, and behavioral patterns he had developed up to that point. Thrown abruptly into the mainstream of American society, Mr Seaquist has ever since tried to master the customs, skills, and attributes to operate successfully in highly competitive but characteristically bureaucratic organizational structures--organizations which often measure success by rates of promotion and other forms of upward mobility. In that process, a desire to pursue the "American dream" was deeply ingrained in him along with the knowledge that hard work and dedication offer the means for making the most of available opportunities.

Mr Seaquist graduated in 1964 from high school in Gaithersburg, Maryland. In 1968, he earned a Bachelor of Arts degree in Business Administration from Gettysburg College and was commissioned a second lieutenant in the United States Marine Corps at the height of the Viet Nam war. Trained in armored warfare, Mr Seaquist successfully completed assignments with the 1st and 3rd Marine Divisions as a Tank Platoon Commander, Intelligence Officer, Battalion Adjutant, and Military Police Officer. In the latter capacity, he played a key role in establishing the Marine Ryukyu Military Police Division at Camp Butler, Okinawa in 1970.

In 1971, Mr Seaquist left management training with a wholesale food distributor to begin his career in civil service with the State of Maryland. In his initial introduction to civil service, he progressed upward rapidly in positions with the Employment Security Administration and the Montgomery County Department of Social Services. In 1972, Mr Seaquist qualified for the Presidential Management Intern Program and entered the Federal civil service as a Logistics Management Specialist in the Air Force. Assigned to the Oklahoma City Air Logistics Center, he spent two years getting first hand exposure to all depot support functions, including maintenance, distribution, and procurement, followed by on-the-job training as a materiel management intern with the Air Force Logistics Command. Assigned to the B-1 System Management Division and the Accessories Item

Management Division at Tinker AFB, Mr Seaquist developed the initial integrated logistics support plan (ILSP) for the B-1 weapon system and carried out a wide variety of system and item management functions. In June 1973, he married Gayle Jeanne King of Oklahoma City, Oklahoma.

In 1974, Mr Seaquist completed his management internship and began work as an inventory management specialist at Headquarters AFLC. Assigned to the Requirements Policy and Systems Analysis Division, Directorate of Materiel Requirements, DCS/Materiel Management, he served as a policy analyst covering a broad range of materiel management functions involving initial and replenishment requirements for economic order quantity (EOQ) and recoverable items. During this period, Mr Seaquist developed the initial data automation requirement for the D029 system which applies marginal analysis techniques to prepositioned WRM requirements. This capability produced savings in excess of $59 million by introducing an automated requirements process, applying resource optimization techniques, and enhancing integration of wholesale and retail requirements computations.

In 1978, Mr Seaquist transferred to the Program Evaluation Division, Directorate of Programs, DCS/Plans and Programs, and became the Command's WRM Program Manager. In this position, he led a joint AFLC/MAC Task Group that developed and implemented joint command procedures for the present single kit concept for prepositioned C-5 and C-141 WRM spares. This action integrated wholesale and retail WRSK/BLSS authorizations and improved the credibility of strategic airlift prepositioned WRM requirements by aligning spares requirements with actual operational needs. Mr Seaquist also helped establish and hosted the first joint MAJCOM/Air Staff Worldwide WRM Conference now held annually by the Air Force.

In 1979, Mr Seaquist was reassigned to the Strategic Planning Division, Directorate of Plans, DCS/Plans and Programs. As a strategic policy analyst, he developed AFLC and Air Force policies designed to introduce greater economies and efficiencies in DOD logistics operations without adversely impacting military readiness and combat capability. These efforts impacted the total spectrum of logistics centralization issues surrounding initiatives such as the transfer of consumables to DLA, the

national supply system, the uniform procurement system, a single manager for conventional ammunition, a unified transportation command, integration of wholesale distribution systems, and a single manager for aeronautical depot maintenance.

In 1981, Mr Seaquist received the Meritorious Civilian Service Award for his instrumental role in fostering greater recognition--within DOD, the Government Accounting Office, and legislative committees--that the Air Force must maintain organic control over critical resources required to carry out its wartime mission. As a result of his comprehensive analyses, AFLC planners, the Joint Logistics Commanders, the Secretary and Chief of Staff of the Air Force, and the Joint Chiefs of Staff were provided with critical information on issues that significantly impacted Air Force logistics support capability. A notable example of his success in this arena was the written testimony and background information he prepared for the AFLC Vice Commander's appearance before the HASC's Subcommittee on Readiness in March 1982. This testimony on the proposed transfer of consumables to DLA led to congressional restrictions that now require the Joint Logistics Commanders' formal certification that military effectiveness will not be impaired before an item can be transferred to DLA.

Following this achievement, his work continued to focus on assessments of broad logistics policies that cut across AFLC functions and military service boundaries. In this capacity, Mr Seaquist documented command issues for presentation to senior Air Force leaders and hosted the first annual visit of the Air Force Issues Team to Headquarters AFLC; played a key role in supporting defense-wide surveys such as the Defense Logistics System Analysis Office (LSAO) analyses on effective wartime distribution of secondary items and DOD logistics policy/procedural modifications for crisis and war surge conditions; and spearheaded several major studies involving fundamental Air Force logistics support processes.

In this latter category, Mr Seaquist conducted a study for the AFLC Commander on geographical areas of responsibility and AFLC's process for assigning worldwide support responsibilities to the air logistics centers.

Focusing on the Command's growing involvement in overseas theaters of operations, this study identified gaps in policy and organization and recommended expanded control over AFLC operations by the Logistics Operations Center. It also recommended assignment of management responsibility for the Support Center Pacific to Ogden ALC, the SPM ALC for the F-16, in lieu of Sacramento ALC which is assigned the geographical area of responsibility for the Pacific region. He briefed these findings to the AFLC Council and gained approval of the recommended course of action.

At the request of the AFLC Commander, Mr Seaquist also developed a prototype management information system for accumulating, arraying, and processing key resource and program information applicable to AFLC, the Joint Logistics Commands, the Military Services, and other defense agencies. His proposed concept and prototype products for managing this vital logistics information (assigned missions, functions, programs, and resources in terms of manpower, money, materiel, etc.) was approved and subsequently submitted to the Joint Logistics Commanders for DOD-wide use.

In a related effort, Mr Seaquist led functional experts in developing the first computed wartime manpower requirement for the DCS/Plans and Programs using FY85 force sizing (FORSIZE) guidance. Lower than peacetime authorizations, this process of determining specific wartime tasks replaced the traditional assumption that peacetime manning equals the wartime requirement in the headquarters planning function.

In April 1985, Mr Seaquist played a principal role in developing AFLC's strategy for supporting the possible acquisition of Northrop's F-20 Tigershark aircraft for the air defense mission. Under his leadership, an AFLC Task Force gained the Commander's approval to pursue unique contractor support arrangements and lifetime product support guarantees on a test basis. These logistics innovations were presented to ASD, TAC, ATC, and AFOTEC for approval and incorporated in Air Force program management guidance for the $5.6 billion Air Defense Fighter (ADF) Procurement. In December 1985, he prepared the AFLC Commander for discussions with the AFSC Commander, the TAC Commander, and the Vice Chief of Staff of the Air Force that resulted in common ground rules to ensure contract award for the ADF

at the start of FY87.

Based on his expertise in this area, Mr Seaquist was subsequently handpicked by the ASD Commander as the Logistics/Management Panel Chief for the ADF source selection. In this assignment, he was responsible for defining the logistics support concept and evaluating contractor proposals for organic and contract support options featuring the Air Force's first attempt to obtain an essential performance warranty for an entire weapon system, multiple alternatives for introducing total contractor responsibility for aircraft and training system support, and aircraft availability guarantees tied to Code 1/Code 2 sortie landing status at a fixed cost per flying hour. To accomplish this task, Mr Seaquist managed more than 100 logistics functional representatives from the ALCs, the AFALC, ASD, TAC headquarters and field units, ATC, AFOTEC, ANG, headquarters AFLC, and the LOC--many of whom where matrixed into the source selection process on an as required basis. In addition to managing daily source selection activities, he presented the Quick-Look, Mid-Term, and Final panel evaluations on the ADF proposals to the Source Selection Advisory Council.

The Secretary of the Air Force was briefed on the source selection results on 8 October 1986 and a contract for 270 F-16A ADF aircraft was awarded to General Dynamics on 31 October 1986. The tremendous complexity and compressed schedule of the ADF source selection prompted ASD/CC to comment that this source selection was one of the most demanding ever undertaken by ASD. The "fast-track" proved to be the basis for subsequent streamlining of the standard source selection milestones in effect prior to that time. Shortly thereafter, Mr Seaquist was assigned to AFLC's newly established CLOUT Program Office.

Mr Seaquist is a senior member of the Society of Logistics Engineers (SOLE) and a life member of the Air Force Association (AFA) and the American Defense Preparedness Association (ADPA). He is also a Certified Professional Logistician (CPL) and has been granted the advanced Professional Designation in Logistics Management (PDLM) by the Air Force Institute of Technology. Mr Seaquist earned a Masters of Arts degree in

supervision and management with a concentration in logistics management from Central Michigan University in 1982. He is a member of Chi Gamma Iota, Veterans Scholastic Honor Society, and Sigma Iota Epsilon, National Honor Society in Business Administration and Management. Mr Seaquist also qualified as an Executive Cadre member of the Logistics Civilian Career Enhancement Program (LCCEP).

The recipient of numerous outstanding performance awards, sustained superior performance awards, quality step increases, and letters of commendation, Mr Seaquist has been nominated several times as Federal Employee of the Year, the George Lucas Planner of the Year Award, and SOLE field awards. In 1986, General Earl T. O'Loughlin, AFLC Commander, presented Mr Seaquist with the joint AFA/AFLC Logistics Materiel Manager of the Year Award.

Mr Seaquist has been active in school and community activities as a PTA Ways and Means Committee member, as a soccer coach, as a member of his church's Administrative Board, and has carried a significant case load as a counselor for the Air Force Personal Financial Management Program at Wright-Patterson AFB. He and his family reside in Dayton, Ohio.